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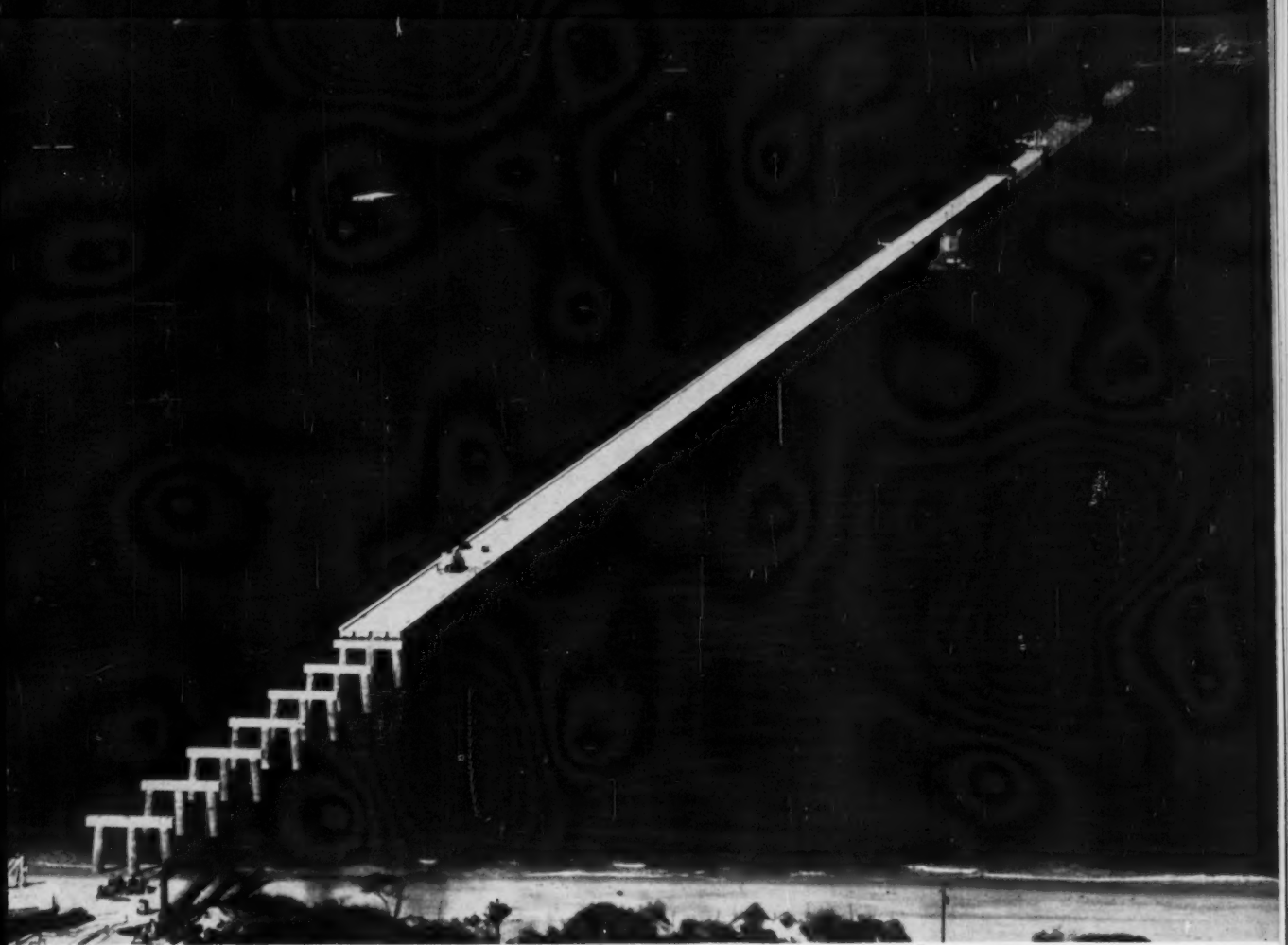

Battling the sea to cross Chesapeake Bay p.32

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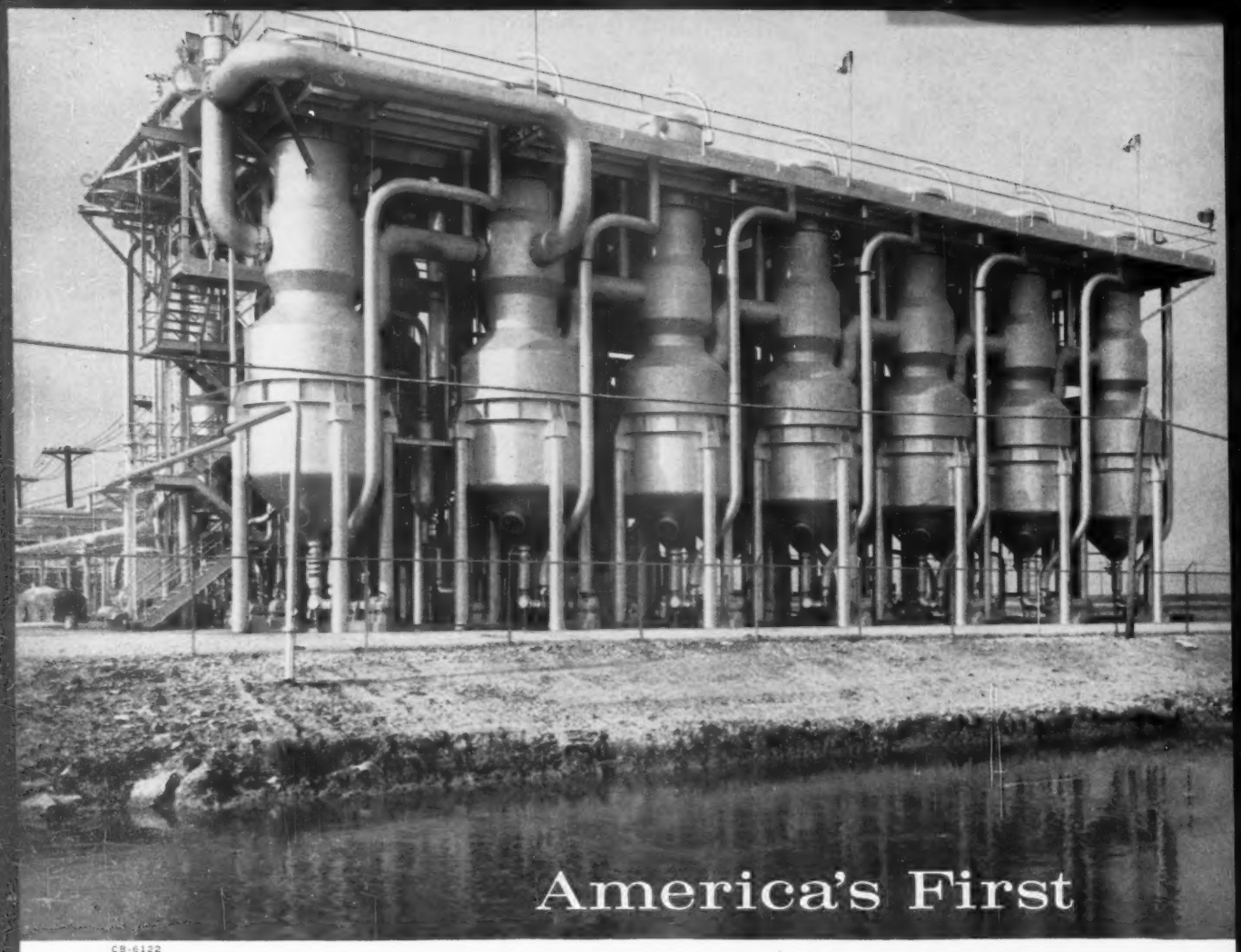

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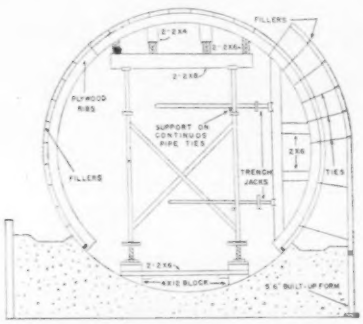
National Engineering and Contracting Co., Cleveland, relied on Symons steel-ply forms to pour a huge quarter mile sewer.

The $400,000 sewer is 13 feet in diameter and 15 inches thick. To meet the 3½ month contract deadline, the inside was formed with three sets of jumbo-mounted Symons forms similar to a gang section. These "jumbos" had hinged ribs



Cross section showing construction features of jumbo form. Workmen, with a block and tackle manually pulled the "jumbo" 30 ft ahead for the next pour.

and rode on plank rails. Each section was 32′ long and was constructed with 12 inch by 8 foot Symons steel-ply fillers. Workmen were able to strip, move a section 30 feet and re-position in one hour. Symons new gang-form bolt simplified assembling and stripping by allowing the ties to be broken back before moving the sections.

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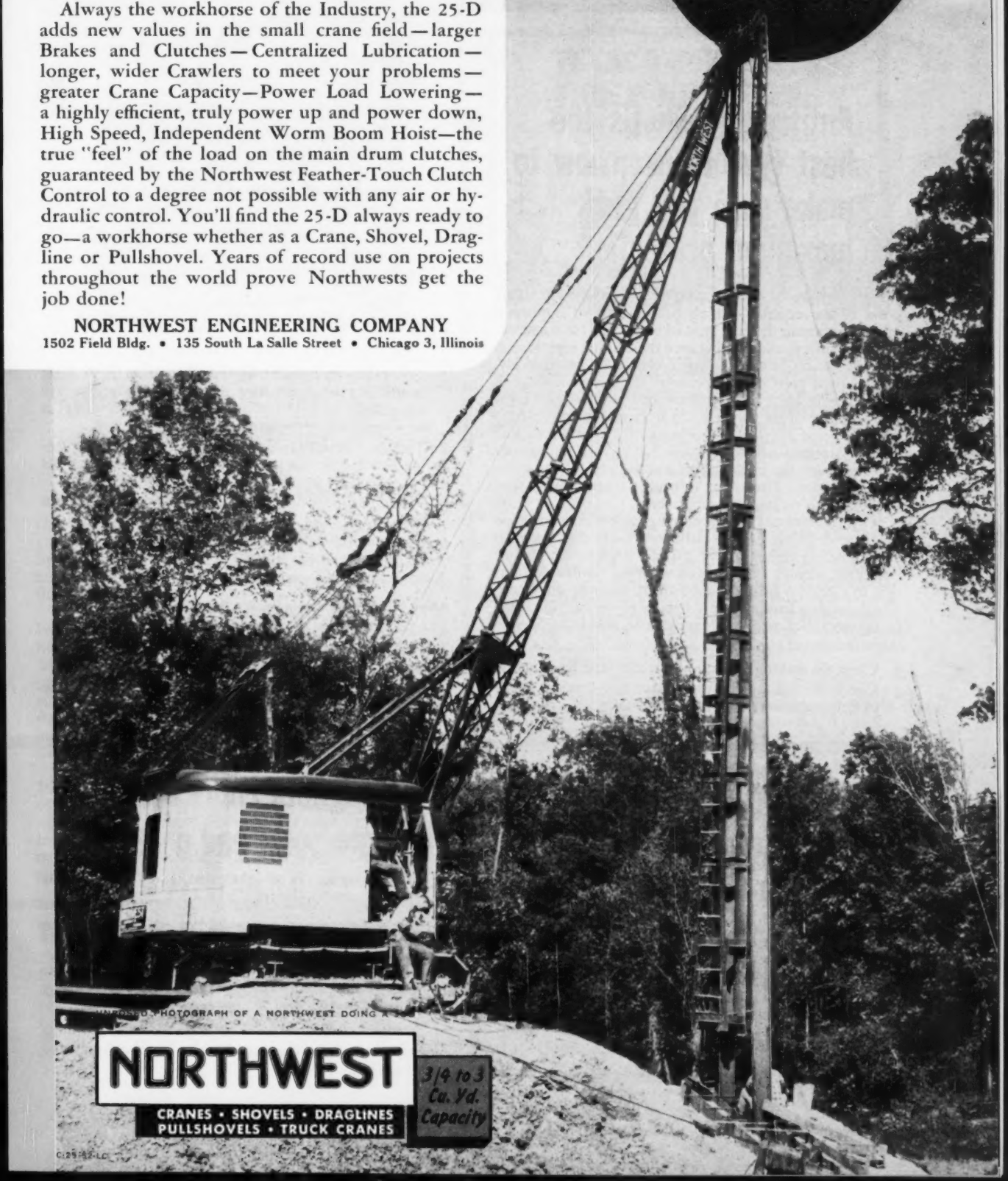


LUBE LOGIC

Tips for more

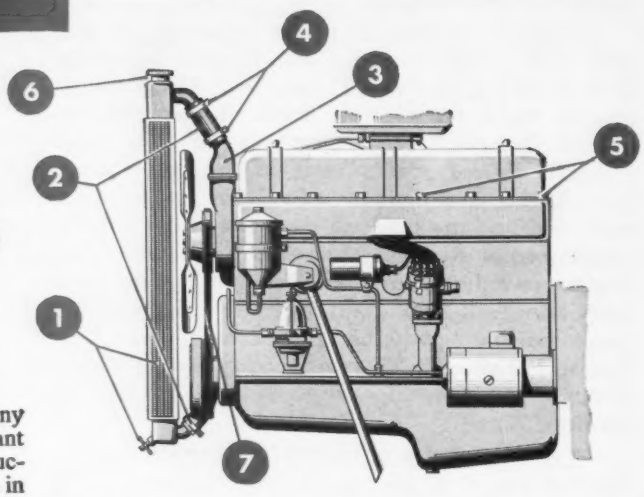
Antifreeze: what's the best type to use; how to make sure you get maximum protection

It's getting pretty close to antifreeze weather in many parts of the country, which brings up two important points: choosing the best type of antifreeze for construction machinery; and making sure the cooling system is in good condition, so the antifreeze can do its job properly.

The right type of antifreeze is the permanent kind. Construction equipment engines operate best at 180°F jacket temperature which is ten degrees higher than the boil-off point for alcohol. Permanent antifreeze (like Texaco Startex) will stay on the job at the temperature that's best for the engine. *Don't* substitute salt or kerosine solutions. They won't freeze, true enough, but they're tough on engine components.

It's important to keep the cooling system in good shape for three reasons: first, because antifreeze that gets into the crankcase causes severe varnish deposits on pistons and rings; second, because you want the antifreeze solution to circulate properly; and third, because antifreeze lost through a leak costs a lot more to replace than just plain water. Before you add antifreeze, check the following points:

1 Clean the cooling system—drain and flush thoroughly.
2 Check the radiator hoses, replace any that are soggy or collapsed.



3 Check the thermostat. If the thermostat is in good condition, the thermostat discharge connection will remain closed until the coolant in the water jacket is up to operating temperature.
4 Tighten connections on hoses that don't need replacing. Antifreeze can pass through spaces too small for water leaks.
5 Tighten cylinder head, oil cooler and other hold-down bolts.
6 Check radiator filler cap gasket.
7 Inspect and adjust fan belt.
8 Now you're ready to put in the antifreeze.

After the antifreeze is in, it's a good idea to:

1 Check the level at operating temperature.
2 Check for leaks.
3 Check water pump packing nut adjustment.
4 Check cooling solution with suitable hydrometer to make sure of protection temperature.

Metal concrete forms can be readied for re-use faster

You can get metal concrete forms cleaned up and back on the job faster if you spray them, before use, with Texaco Stazon. Use the Stazon just as it comes from the container for best results. Field reports say it gives the concrete a fine smooth finish, and the Stazon prevents sticking, shortens clean-up manhours.

Magneto Lubrication: three *IF*s and a *BUT*

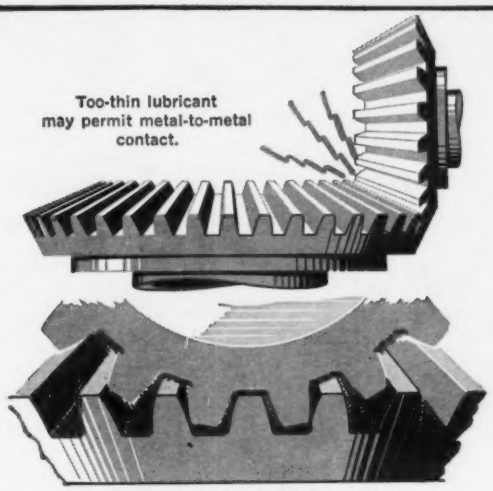
IF the magneto is oil-lubricated, apply a few drops of oil every 500 hours.

IF the magneto is grease lubricated, apply Texaco Marfak Multi Purpose 2 every 100 hours.

IF the magneto is located near the engine exhaust pipe, lubricate with Texaco High Temp Grease every 50 hours.

BUT if the bearings on your magneto are *sealed*, follow manufacturer's recommendations and let the distributor do the servicing.

efficient equipment performance



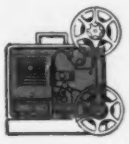
Too-thick lubricant will hold dirt,
pack in gear teeth, may damage bearings.

Key points in choosing gear lubricant for gyratory crushers

One of the toughest lube jobs on a gear-driven gyratory crusher is the gears themselves. They're partly protected by oil-tight cases and dust rings, but some contamination is inevitable, and it's essential that you choose a lubricant that can take it.

Viscosity is very important. These gears are very heavily loaded, so too-low viscosity may not provide a film thick enough to prevent metal to metal contact. On the other hand, if the lubricant is too thick, it will hold grit and dust in suspension, and let it develop a scoring action on the gear teeth. In addition, dust tends to dry out lubricants, and also creates a "packing" condition between gear teeth. This packing of dust and dried lubricant can build up undue pressure on gears and bearings.

Your best bet is a lubricant with a viscosity between 50 and 160 seconds Saybolt Universal at 210°F, with extreme pressure characteristics. These specifications will get you a lubricant with a good compromise between too thick and too thin. Ask any Texaco Lubrication Engineer to help you pick the right grade for your temperature zone.



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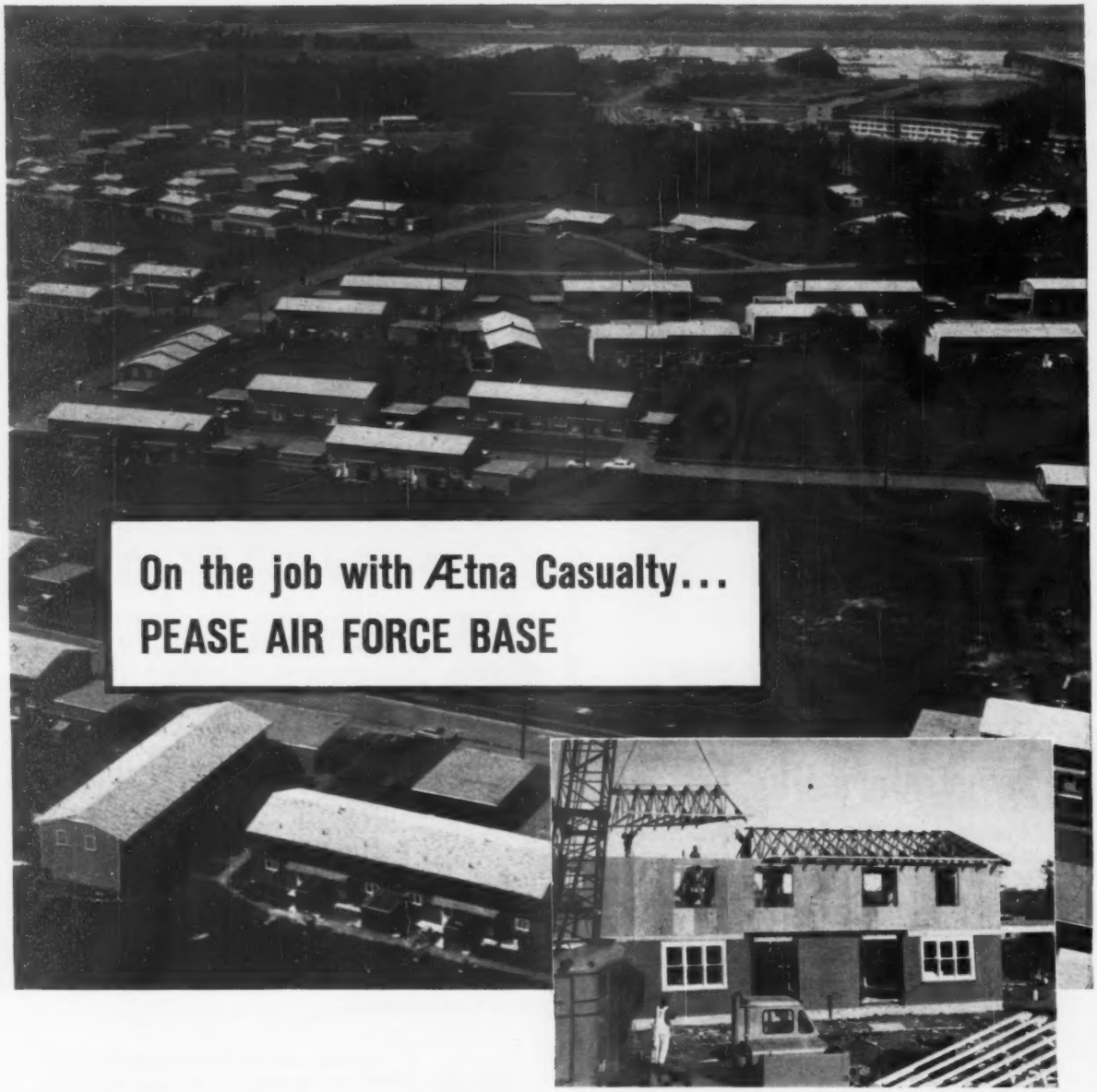

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Reader Comment

Electric Heating Costs

SIR—The article, Electric Heating Goes Farther North (ENR Aug. 24, p. 41), in my estimation borders on the unethical and contains half-truths.

My opinions are certainly biased, since I am employed by an oil company; however, the views that I express are completely unsanctioned by my company and I am not a part of the management.

The article mentions a kilowatt-hour cost of 13.22 to 13.46 mils. Why not call this an average of 13.34 mils per kwh, or 1.334¢ per kwh? With 3,415 Btu per kwh, the energy cost comes to 0.39¢ per Btu for electrical heating at 100% efficiency.

The cost of No. 5 fuel delivered will be about 9¢ per gal (8.15¢ fob). With 150,000 Btu per gal, energy cost is 0.06¢ per 1,000 Btu. For a heating plant efficiency of 75%, the oil cost becomes 0.08¢ per 1,000 Btu or an oil cost of about one-fifth that for electricity.

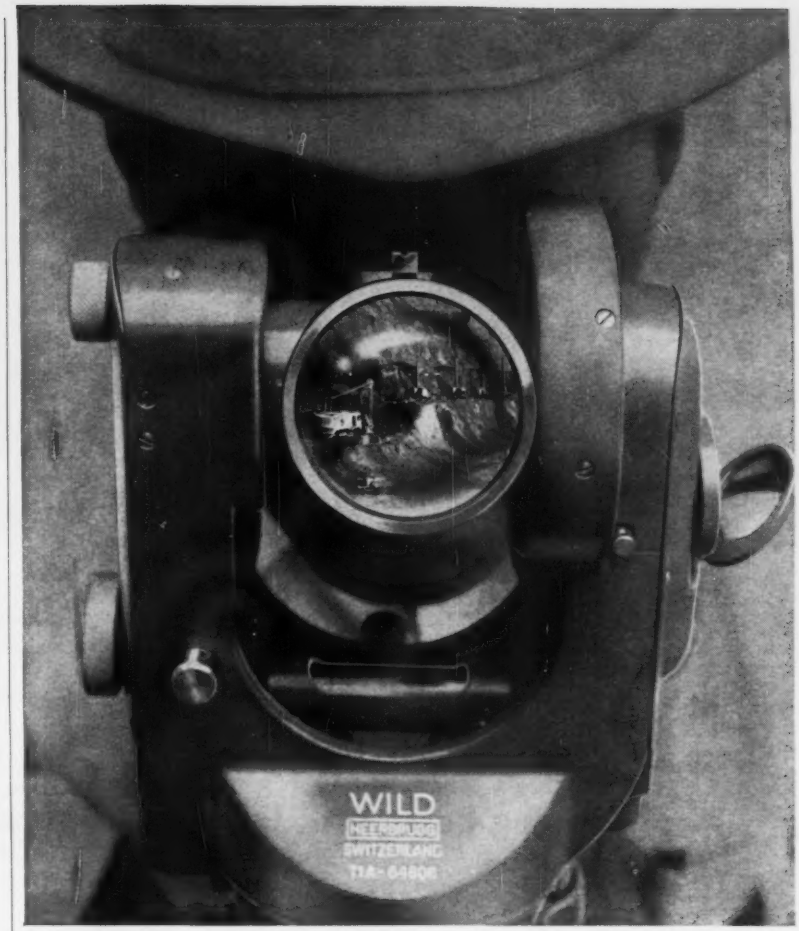
According to the article, labor cost for electric operation is to be one-eighth to one-fifth that for oil. I am not in a position to argue this point too strongly, but I suspect that someone has used the argument that "you have electricians on the job anyway so you don't need to hire anyone else." This is a good philosophy quite often used for a business that is intent on going broke. Someone is going to be needed to change the burned-out elements in the hot-water heaters and change the burned-out convectors and radiant elements, adjust thermostats, etc.

Initial savings were estimated at $50,000. Actual savings turned out to be $121,000. Who calculated these costs—the utility company or a qualified, nonpartisan heating engineer? Who did the electrical design work—the utility company or a qualified nonpartisan heating engineer?

Space requirements for heating equipment, the article says, would be reduced 70%. Does this saving include space requirements for the additional transformers and switch gear, or is it merely the minor difference in size between an electric baseboard convector versus a hot-water baseboard convector?

The article also stated: "Estimates of initial savings were based on a 70% reduction in construction costs and a 40% cut in equipment costs, in favor of electricity." Does this mean that the $2 million cost of the building would have been $7 million had an oil heating system been used? That's quite ridiculous! If it means merely that electrical heat took less material and manpower to install, does it include the additional cost of 4-in. foamed insulation and weatherstripping to bring the yearly electrical cost within a price range that otherwise would bankrupt Las Vegas?

(*Reader Comment continued p. 12*)



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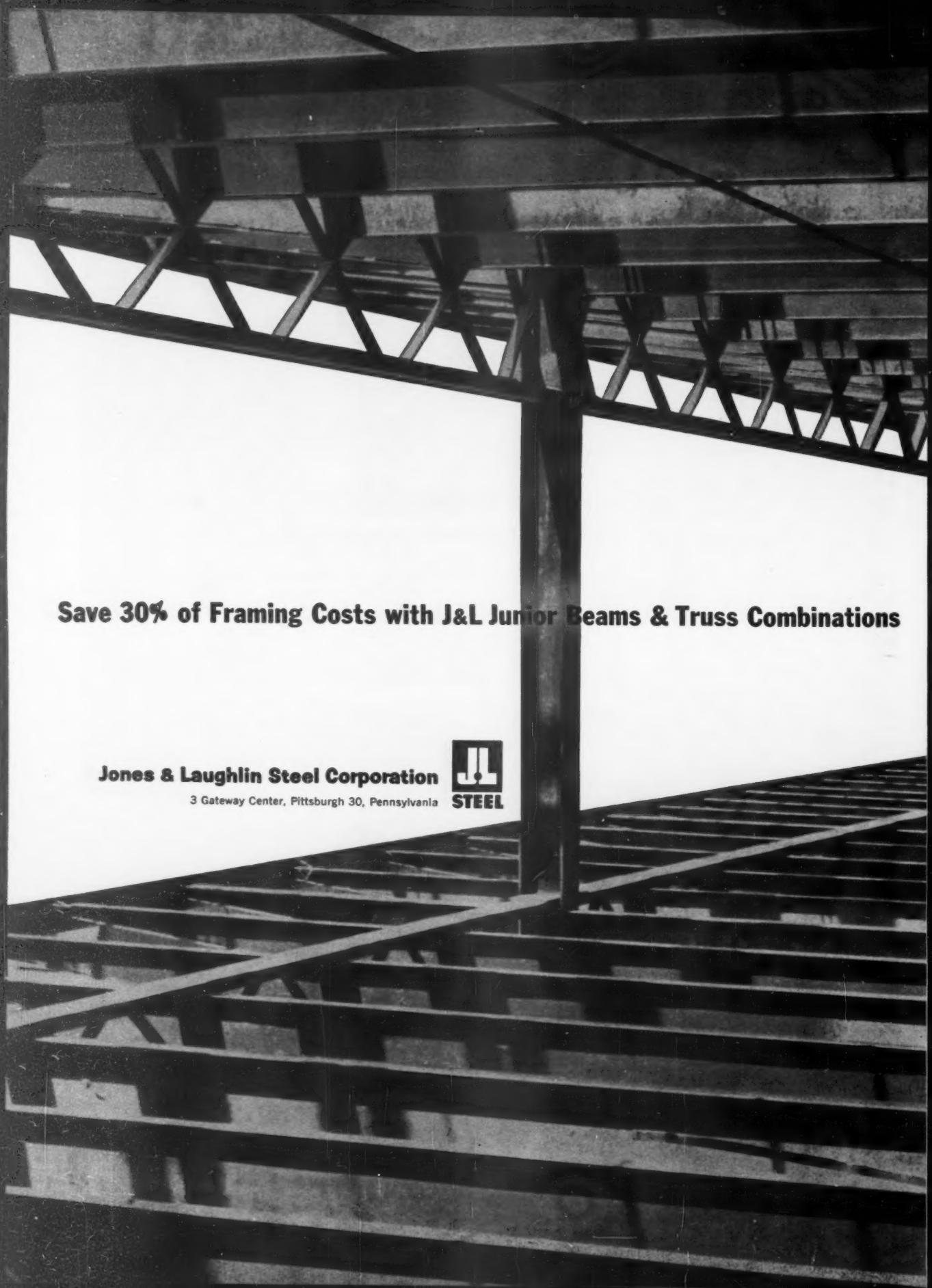
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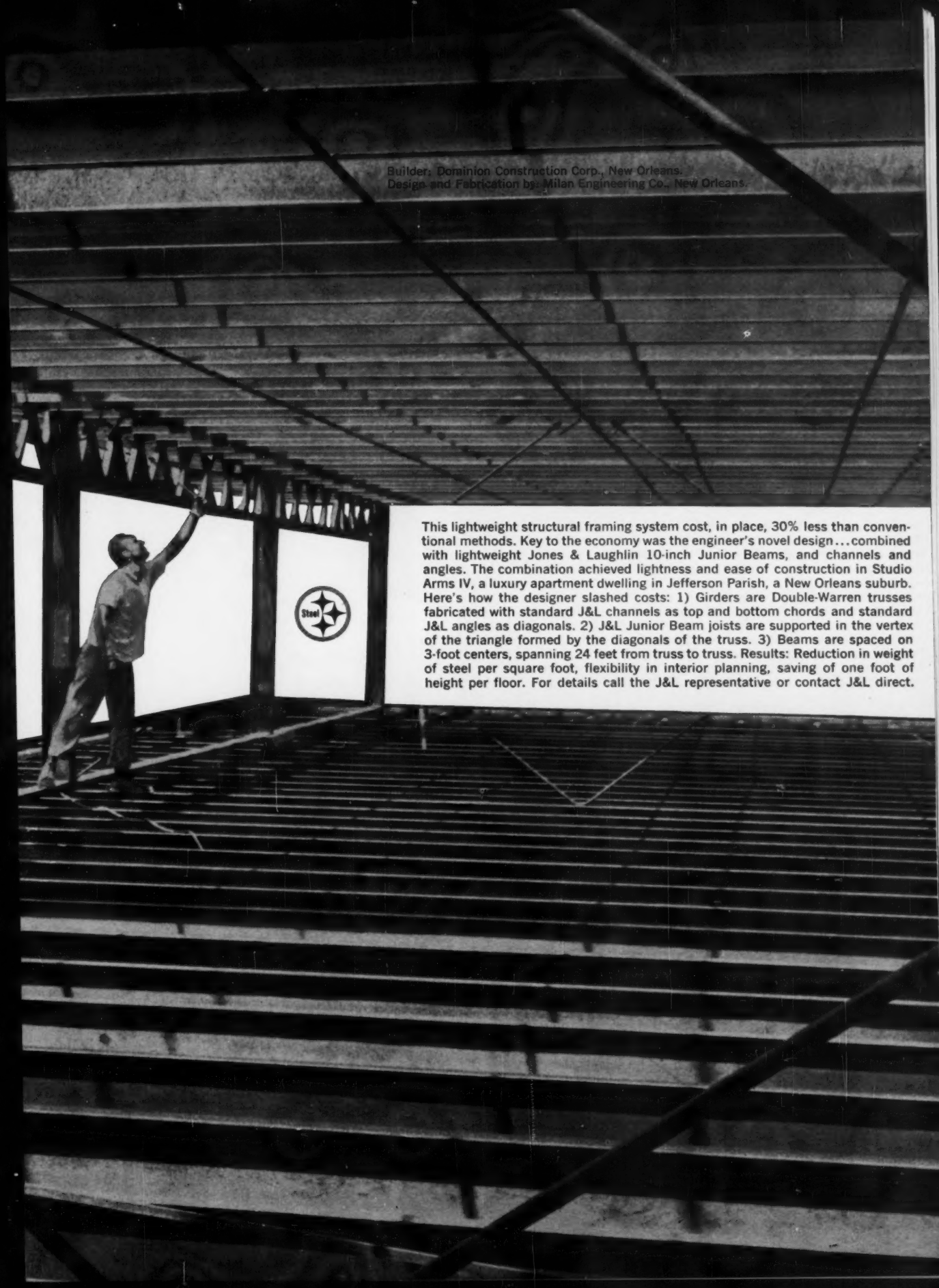

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Design and Fabrication by: Milan Engineering Co., New Orleans.

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. . . Reader Comment

Zone control is also very simple to install with any type of oil heating equipment.

What arrangements have been made for fresh air supply to the nun' cells, etc? Or, is the electric heat too expensive to permit this?

D. E. SAFFORD
Park Forest, Ill.

Editor's Note—Kirkham, Michael and Associates, electrical engineers, Omaha, Neb., designed the heating system and made the comparative cost studies.

Some Protection vs None

SIR—In your editorial Shelters Need More Thought (ENR Oct. 5, p. 94) it appears evident that you are concerned with construction standards with little study of the technical or population problems.

To design shelters for extreme conditions is impossible. If everyone had or was building a shelter, then an improvement in standards would have some meaning; but the use of minimum standards will lead to a continuation of the present condition, where only a fraction of the population has protection.

One problem is to eliminate hand blowers by use of larger openings. Filters are of doubtful use, and anyway 90% of radiation dosage will decay in the first 28 hours (with 4-hour maximum level after bomb burst). With present fallout forecasts, it appears that a two-week occupation is a remote possibility.

The survival of the present program depends upon disregard of "safe" or plush installations, such as you propose, if any protection is to be provided at all. "Inadequate" provisions for living in shelters are a great deal better than none; and shelters at present could be provided (on an "inadequate" basis) for a possible 10% of the population in my area of the country.

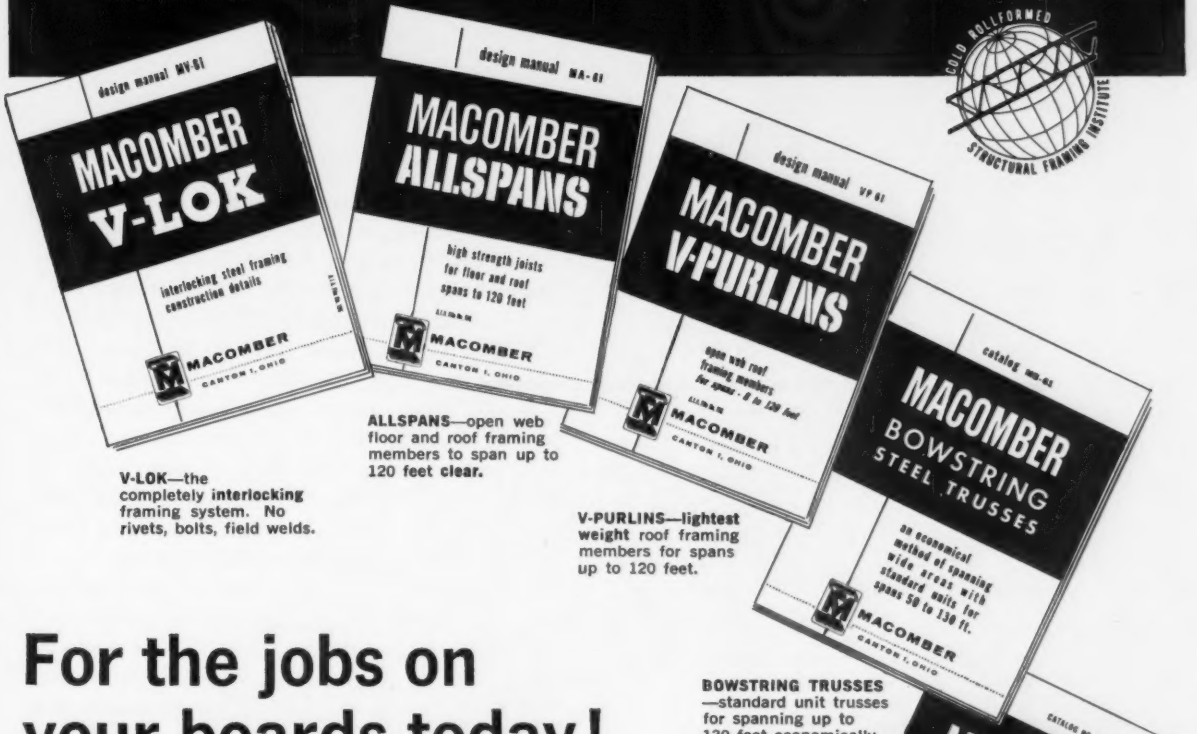
I agree we should cope with "fly-by-night operators", but an attempt to restrict construction by either plush standards (the words are from officials of OCD) or by code restrictions will result only in the early death of the shelter program.

My own connection with this program is as instructor of architects and engineers to be engaged in the survey program and later design work. When the survey is completed, the public will learn that the degree of protection and comfort of present home shelters cannot be available to even a small portion of the population.

KING ROYER
Dept. of Building Construction
University of Florida

Editor's Note—Encouraging people to build death traps in the faint hope of protecting them from fallout does not make sense. The problems involved in shelter construction are capable of engineering solution. The Army reports filters do work.

COMPLETE READING ON ECONOMICAL HIGH-STRENGTH OPEN WEB FRAMING



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World's longest vertical lift bridge weighing 4 million pounds lifted with USS Tiger Brand Wire Rope

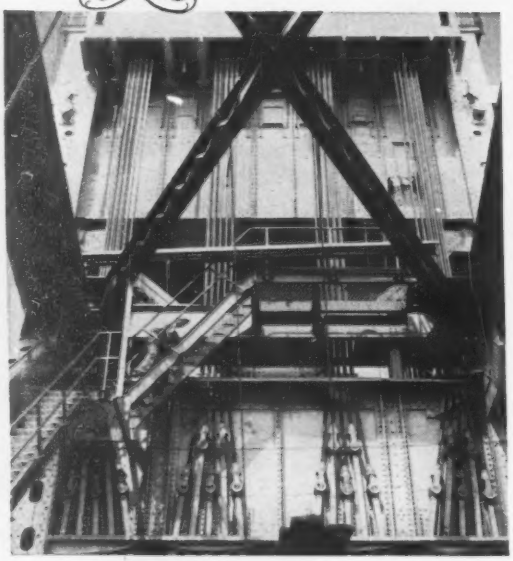

Photo shows how USS Tiger Brand Rope is anchored to lift span with adjustable assemblies to maintain even tension. Ropes travel over power-driven 15-foot sheaves at top of tower.

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This giant 558-foot span weighing 4 million pounds can be raised or lowered 104 feet in about two minutes. Eighty main wire ropes 2¼ inches in diameter and 170 feet long do the job. Each rope has a catalog breaking strength of 215 tons—for a total of 34,400,000 pounds. These USS Tiger Brand Wire Ropes are all 6 x 19 Filler Wire Construction Monitor Grade Prestressed Counterweight Assemblies.

The bridge also has an auxiliary counterweight system that requires eight Tiger Brand Ropes 1⅜ inch in diameter of similar construction but with fiber center. Their total length is 1440 feet. More than 99% of the weight is counterbalanced.

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Staten Island Rapid Transit Railway Company bridge across the Arthur Kill at Elizabeth, N.J. This company is a wholly owned subsidiary of the Baltimore and Ohio Railroad Company. Bridge designed by Parsons, Brinkerhoff, Quade and Douglas, consulting engineers.

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ENGINEERING NEWS-RECORD

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THE CONSTRUCTION WEEK

CLEAR THE BOARDS—Pennsylvania's General State Authority starts moving $200 million worth of construction projects to the design stage. On November 22, the Authority's increased borrowing ceiling goes into effect. Building programs of 13 state departments are involved including: welfare, $73 million; state-aid colleges, $41 million; public instruction, $33 million; and water, $28 million. Nearly all of the projects will go out for bids in 1962.

DOWN TO STAY—Contractor Merritt-Chapman & Scott, after one unsuccessful attempt (ENR Oct. 12, p. 17), last week sank and concreted the first section of trench-type tunnel on the $200-million Chesapeake Bay Bridge-Tunnel project (see p. 32 for a detailed story on design and construction of this crossing).

DYING HARD—The latest attempt to wreck St. Louis' modernized building code (ENR June 15, p. 32) died last week when aldermen, responding to Mayor Tucker's threat to veto proposed amendments, referred the bill back to committee. Most controversial of several amendments would require extensive use of rigid metal conduit.

BRITISH LAND IN BOSTON—A pair of British investment firms has jointly bought two major building sites in downtown Boston. They plan to build a $20-million, 30-story office tower that will be the city's tallest building.

ALL THE WAY WITH ALWEG—Alwac International, through its Alweg Monorail Division, says it will make a firm proposal next week to the Los Angeles Metropolitan Transit Authority to finance and build the Authority's projected 23-mile backbone rapid transit system (ENR Aug. 10, p. 22). The proposal will represent a refinement of a preliminary offer made to MTA last June. At that time Alweg said it could build the backbone route at far less than the $192-million figure estimated by MTA.

BUSY GRAND JURIES—A federal grand jury in Miami indicted three Florida asphalt paving supply companies on price-fixing and bid-rigging charges going back to 1959. In DeLand, Fla., seven members of Reynolds, Smith & Hills were indicted by a county grand jury on grand larceny charges. Members of the Jacksonville architect-engineer firm were charged with taking "more than $100 from Volusia County School Board for services or materials not delivered."

HOUSING STARTS IMPROVE—Private housing starts during October jumped to a seasonally adjusted annual rate of 1,442,000 units, compared to 1,326,000 in August and 1,380,000 in September. Actual starts for the first 10 months total 1,119,100, 2% above the same period last year.

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WASHINGTON OBSERVER

- **Early death predicted for tax-break bill**
- **Korea opens door to foreign investments**
- **Army eyes Potomac River Basin development**

- **Outlook for a tax-revision bill in Congress next year is getting more doubtful all the time.** The Administration has failed to whip up much enthusiasm, either in Congress or in the business community, for its two-way plan for an 8% credit on equipment purchases—and possibly on plant construction—along with a closing of several tax loopholes.

  Administration officials now are beginning to doubt the wisdom of trying to get such a bill through Congress. They may let the matter die with only token support and use all their energies to swing congressional approval of a plan to revise drastically the Reciprocal Trade Act (see p. 22). Both moves must be cleared by the House Ways and Means Committee, and either is a major task for a single session of Congress.

—

- **Korea is opening the door to foreign investment, and construction projects are high on the priority list of needs.** Until now, no private foreign capital has been invested in Korea. But the government, backed by private business groups, has outlined a development plan calling for private investment of $1 billion to $2 billion in the next 10 years. Tax incentives are offered foreign investors along with use of the second cheapest labor supply in the world.

  A small group of Korean business leaders is selling the plan in this country. They give top priority to a rapid rebuilding and expansion of the nation's transportation systems—roads, bridges, railroads and ports. Construction materials of all kinds are needed for the economic buildup, and the plan puts specific emphasis on power projects and a direct-reduction steel mill.

—

- **Four alternate plans to develop the Potomac River Basin are now under study by the Corps of Engineers.** The schemes cover flood control, water supply, pollution abatement and recreation at 23 major sites. Costs of the four developments, excluding power projects, range from $408 million to $506 million. The Corps will make a final decision in about six months—after the Federal Power Commission reviews the plans and recommends possible hydropower sites.

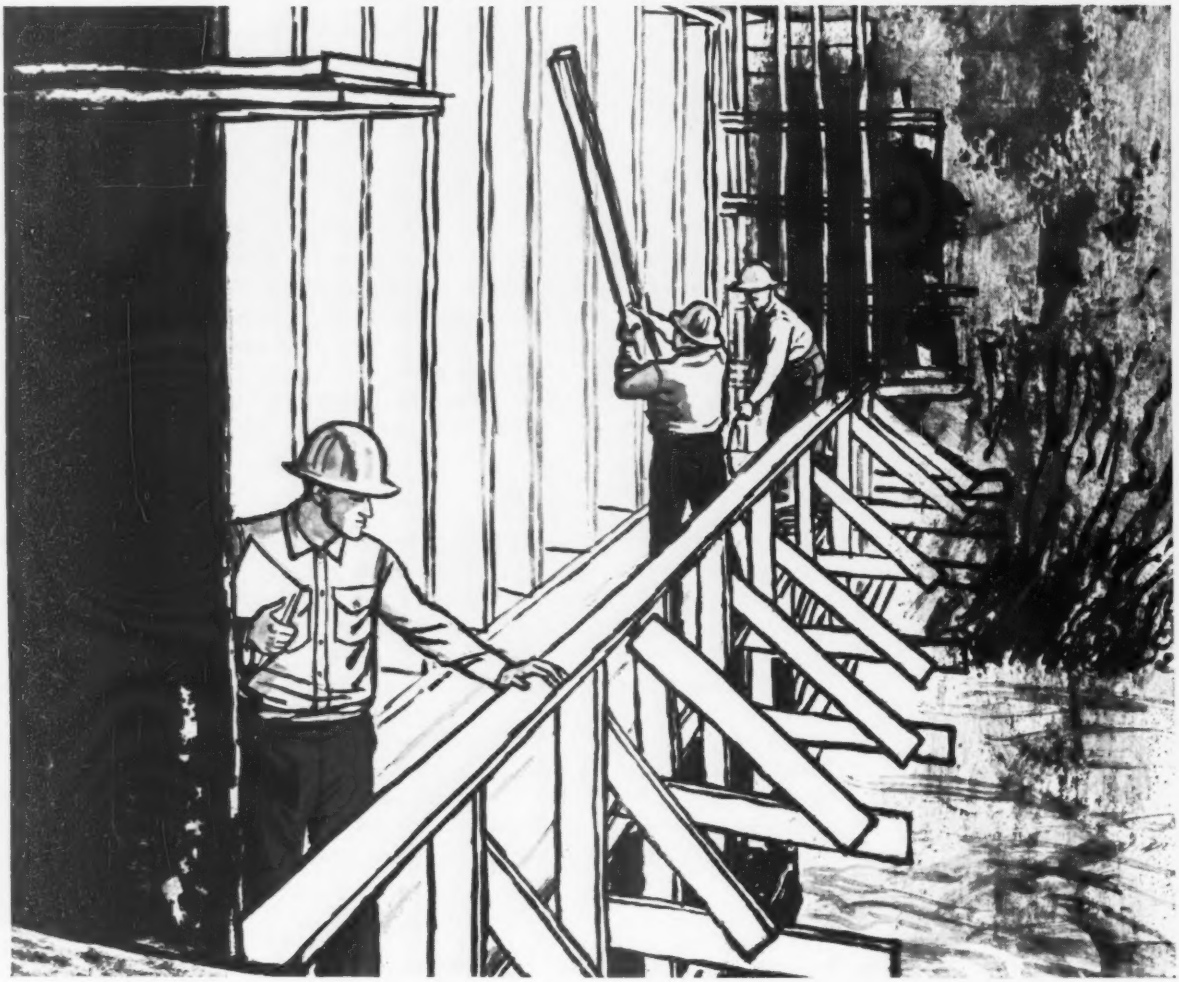
—

- **Health-Education-Welfare Secretary Abraham Ribicoff has decided what to do—in part at least—about proposals to upgrade the administrative level of federal water pollution control activity.** He has designated Assistant Secretary James M. Quigley as his personal representative in administration of the program. Says Mr. Ribicoff: "This will be the first time that a senior policy-making official of the Department has been directly involved in the administration of this extremely important program."

  Chiefly, Mr. Quigley will review existing activities and recommend improvements in the pollution control program. He will also be responsible for reviewing all water pollution problems in which federal enforcement action might be brought and for making recommendations directly to the Secretary.

PROTECTION IN DEPTH

How it helps cut compensation costs



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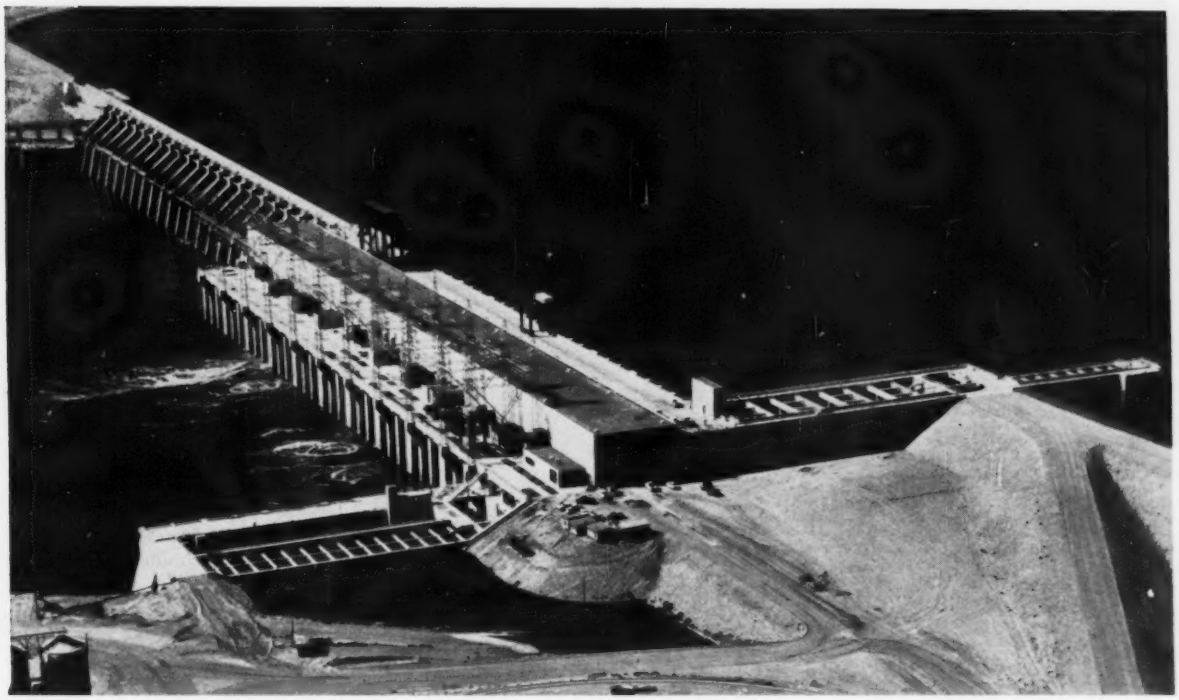

Priest Rapids project produces power ahead of schedule, so . . .

M-C&S Earns $2.3-Million Bonus

Merritt-Chapman & Scott's bonus-baby—the $98-million Priest Rapids Dam on the Columbia River in Washington—earned for its parent a $2,263,000 extra payment. This amount will be paid "pretty soon," perhaps within a couple of weeks, according to a spokesman for the owner, Grant County Public Utility District.

But because every silver cloud may have a little black lining, the New York City-based construction corporation possibly faces an extended delay in collecting some $10 million in retainage held by the PUD.

Although Harza Engineering Co. of Chicago, the dam's designer, and construction supervisor for the District issued a certificate of completion September 28, Grant County authorities won't accept the project as completed. They report that some gates that stick may need replacing and some painting must be completed. Cost for this work could run to $150,000, but sources other than the District figure the outlays at much less.

Other complications apparently threaten, since the Utility District just hired a law firm, Washington & Wickwire of Ephrata, Wash. This could be the first step toward the courts where the District may dispute the amount still owed the contractor. The $2.3-million bonus, however, does not figure in this part of the picture.

The brewing argument on the amount still owed relates primarily to extra work ordered illegally by Glenn A. Smothers, who resigned in 1958 as manager of the Grant County PUD. He quit after investigations revealed work and equipment totaling about $1 million had been ordered without obtaining bids.

The forthcoming test of strength—either in or out of the court—promises to revolve around that $1 million or so, since the District called in the lawyers to "assist and advise the PUD in final settlement."

To all of this, M-C&S says little. The company reports that after receiving the certificate of completion from the engineers, it requested release of the retained percentage in accordance with the contract. The company also turns aside questions on the job's profitability. "It is not possible to determine the final results at this time," says a spokesman for M-C&S.

Despite the size of the bonus, perhaps the largest ever paid on a public works project, an even bigger one got away.

In October, 1959, the Priest Rapids powerhouse started spinning out kilowatts a full 16 months ahead of schedule.

Under the contract with the PUD, the contractor got 1,900 days from July 16, 1956 to complete work. The contract stipulated a penalty of $3,000 a day thereafter for each generator not producing power, but a bonus of $1,300 a day for each of the 10 units operating before the deadline.

Officials of M-C&S figured a bonus as high as $4 million. Other authorities placed the likely total closer to $5 million.

But on Apr. 25, 1960, a transformer failed. English Electric Co., the subcontractor that supplied five transformers, shipped the faulty unit back to its factory in England (ENR July 7, 1960, p. 25).

The other four transformers followed in relays to the company's plant in Canada for modification. The estimated $4-million to $5-million bonus started shrinking, finally settling to the amount just announced.

Imports Fight Coming to a Boil

Protectionist sentiment in the U.S. rose as Japanese and West European industrial products cut into sales and earnings of domestic companies. The import-flood hits a range of construction products—cement, aluminum, steel and other materials.

Intense local pressures to keep foreign competition out of local construction projects provided the stimulus for new regulations in several states banning purchases of foreign materials for state-financed projects. These regulations are being challenged in a tug-of-war that reflects the intense protectionist vs. free trade struggle expected to dominate Congress next year.

The Reciprocal Trade Agreements Act expires June 30, 1962, so President Kennedy plans to ask Congress for more freedom to cut tariffs across the board instead of on an item-by-item basis as at present. The President insists the U.S. must lower trade barriers or be shut out of the Common Market and other newly developing trade unions. High-tariff interests are girding for a fight.

While most states still do not enforce restrictions on use of foreign goods in public projects, pressure for protection from foreign bidders continues to mount as foreign companies increasingly pursue state contracts.

Three years ago the Texas Highway Department ordered that contractors use only American materials. That is now being challenged in the courts by the Texas Association of Importers and others on the grounds that it is outside the jurisdiction of the Department; and a constitutional question is involved since the federal government has exclusive authority over foreign commerce.

The Alabama Highway Commission last April issued an order similar to that of Texas.

In Dade County, Fla., the authorities a few weeks ago declared that no foreign materials may be used in construction of—ironically—an international seaport, Miami.

In Oregon the lumber mills and wood processors suffer under competition from Japanese plywood. Japanese firms buy Oregon logs, make plywood, then ship it back to the U.S. The Oregon legislature therefore passed a law forbidding export of logs cut on state-owned land, an ineffective measure since most logging is on private land.

The balance of payments deficit has led the U.S. government to encourage purchase of U.S., rather than foreign goods. Since 1954, a rider attached to defense appropriations acts has required the military to buy food and clothing entirely from domestic sources. The foreign-aid program since 1959 has placed "primary emphasis" on financing purchase of U.S. goods and services.

Just this week the State Department gave in to pressures from the chemical industry on a big order of fertilizer for Korea under the foreign-aid program. Japanese bidders received $7 million worth of a $17-million order by underbidding U.S. competitors as much as 30%. Under pressure, the State Department reconsidered and disqualified the Japanese on the grounds that Japan is one of 19 nations considered in a good enough balance of payments position that the U.S. need not let them in on aid contracts.

The aluminum industry claims it is hard hit by foreign competition, mostly in sheet and plate, but also in structural bars. The industry claims Europeans are getting 94% of U.S. military aluminum purchases in cases where they compete—in spite of the federal Buy-American law, which gives domestic companies a 6% price advantage.

The State Department attempts to exert gentle pressure on states where it finds buy-American activity increasing. A State Department witness recently testified before the California legislature which was reconsidering its buy-American law. An official at a convention of the Council of State Governments last week explained the benefits of a freer U.S. trade policy and tried to head off any buy-American developments.

There has been no effort to dictate to the states on federal-state highway construction projects, however, since the failure of an attempt in 1960. The State Department pressured the Bureau of Public Roads to issue an order that in highway projects using federal funds no buy-American provisions more restrictive than the 6%-12% federal formula could apply. Delegations from Texas and Pennsylvania, led by Pennsylvania's Governor David Lawrence, descended on Washington and succeeded in getting the order "indefinitely" delayed. BPR says there is no thought of reviving it now.

An important ruling affecting a major aspect of federal buy-American practices is looked for in Washington within the next week or two. It involves an Executive Order issued by President Eisenhower in 1954 declaring that if no more than 49% of a product is made in a foreign country, it qualifies as a domestic product.

Baldwin-Lima-Hamilton Corp. won a $17.8-million contract to supply 15 hydro turbines for the John Day Dam, under construction on the Columbia River for the Army Corps of Engineers. Allis-Chalmers Manufacturing Co. is challenging the award (Allis-Chalmers bid $20.8 million) on three grounds:

- B-L-H claimed only 42% of its work would be performed in Japan; Allis-Chalmers claims 70% was being done there; A-C would do all its work domestically.
- The Eisenhower order should be rescinded because it conflicts with the original Buy-American Act; the Act says "substantially all" of contract work must be done in the U.S. to qualify as a domestic bid.
- The award is a threat to national security because it would damage the domestic industry.

If the Comptroller General agrees that more than 49% of the work is being done abroad, the Corps of Engineers will probably accept this and B-L-H will lose the contract. If he issues an opinion that the Eisenhower order does conflict with the Buy-American Act, the consequences would be far broader. President Kennedy would not

Limestone Taxes

Dambuilders' troubles with cavernous limestone gave a strong construction flavor to recent sessions of the Engineering Geology Division of the Geological Society of America.

B.C. Moneymaker, chief geologist of the Tennessee Valley Authority, reviewed TVA's 28 years of experience with the material. He said the agency had built 12 hydro and three steam plants and had bought three dams on troublesome limestone or dolomite foundation beds. Meticulous care is essential in preliminary subsurface investigations in such areas, he said.

At one site, he said, TVA encountered a solution cavity over 200 ft deep and 90 ft wide at its surface. The broken and weathered material it contained had to be mined out and replaced step-by-step with mass concrete. The concrete eventually formed an underground dam about 200 ft high that nobody has ever seen.

Unusual "false fronts" that occur in limestone adjacent to river channels in much of the Tennessee Valley were described by J.M. Kellberg, also of the TVA geological staff. Even though such limestone or dolomite bluffs may appear sound and solid, they can conceal badly eroded rock, he said.

Bruce E. Clark, of the Corps of Engineers staff at Nashville, said an underground cavity caused the Corps to shift the site of Barkley Dam, on the Cumberland River. Preliminary boring disclosed a very deep solution channel crossing the proposed dam site. To

want to rescind the Eisenhower order, since that would have the effect of tightening the trade barriers.

More buy-American opinions will be heard in Congress this year when the fight over liberalizing tariff policy gets rolling. Rep. John Dent (D., Pa.), chairman of a special subcommittee that has been holding hearings on import-export policy, has urged that the Buy-American Act be strengthened. Mr. Dent's own district has been hurt by foreign competition and there are many others with electronics, textiles, machine tools and metals suffering from similar competition.

The drive for more liberal trade policy will be led by the President himself. He will also find considerable support both in Congress and from big corporations that have large export markets. A recent staff report of the Senate Commerce Committee recommended that the U. S. pursue a more liberal tariff policy. Industries suffering from foreign competition, it said, should be given forms of help other than tariff protection, such as tax incentives for plant modernization.

Dambuilders' Wits

minimize the potential problems, the designers shifted the location of the dam, lock and powerhouse upstream. The lower guide wall still had to cross the cavity, however, so the builders installed a heavy reinforced concrete mat. They also injected more than 1,800 cu yd of cement grout into the rock openings under the edge of the main river cofferdam to fill cavities in the underlying limestone.

T. F. Thompson, a consulting geologist of San Francisco, described a grouting job probably bigger than any ever done before. It will produce a grout curtain 17 miles long and up to 200 ft deep under dams and dikes of the Manitoba Hydro-Electric Commission's Grand Rapids power development on the Saskatchewan River.

Local topography requires more than 17 miles of embankments. All will be founded on the local Silurian dolomitic limestone, which is honeycombed with cavities of all sizes. Grouting goes on around-the-clock, seven days a week. Exploration of the cavities was greatly aided, Mr. Thompson said, by a down-the-hole flow meter, which made it possible to pinpoint the locations of cavities and to determine the water flow in them.

The Engineering Geology Division took under consideration a suggestion from GSA's council that it take steps to foster a national association of engineering geologists. If formed, the association would probably affiliate with GSA.

Old Tower Gets Face Lifting

The Metropolitan Life Insurance Co. Tower, a midtown Manhattan landmark that ranked as the world's tallest building for a few years after its completion in 1909, is getting a new limestone facing as part of a multimillion-dollar renovation program. Other modernizing features include replacement of old elevators and installation of air conditioning.

Metropolitan Life officials decided to turn the necessity for replacing deteriorating Tuckahoe marble facing into an opportunity for bringing the old tower into architectural harmony with its new Metropolitan Life neighbors.

The new limestone facing (4-in.-thick limestone backed with brick) will eliminate the old-style gingerbread ornamentation. Simple moldings will replace ornate cornices; the pyramidal sections at the top of the tower will become plainer; and at the four building corners, where leakage, rust on the columns and flaking marble have presented problems, new limestone quoins will be installed for the full height.

Removal of the walls from the 29th to the 36th floors of the 50-story building has produced a weird aspect to the old tower. Viewed from a distance, the tower top appears to be partially floating in space, with only the spidery scaffolding, the slender steel columns and the inner core of the building connecting it to the main tower block.

Existing side walls remain between the fifth and 29th floors, thus producing the odd appearance.

Stone-faced steel columns will replace load-bearing marble columns forming a colonnade near the top of the tower. These marble columns had shown signs of structural distress.

Also removed are the exterior walls from the first to the fifth floors, to be replaced with Alabama limestone. The marble facing scheduled to remain will get a good cleaning to blend it with the new limestone.

The demolition contractor has removed all four quoins for the full height of the building. The trussed steel corner columns, exposed by removal of the marble, have been cleaned and painted. Expansion joints located close to each corner will relieve thermal stresses in the limestone quoins specified to replace the old marble.

Architect for the renovation program is Lloyd Morgan; general contractor is Starrett Bros. & Eken. Structural engineers are Purdy & Henderson, the same firm that originally designed the building frame. All are from New York City. Demolition contractor is Cuyahoga Wrecking Co. of Cleveland.

Project completion is scheduled for February, 1963.

BARED STEEL in New York's Metropolitan Life Tower awaits limestone facing.

BPR Slows Highway Fund Release

The federal government moved last week to slow the release of federal-aid highway funds to the states. Advance release of quarterly allotments will be shortened in three stages from six weeks to zero by July 1, 1962, when the next fiscal year begins.

In a letter to the state highway departments, Federal Highway Administrator Rex M. Whitton gave advance notice that funds for the third quarter of the current year, starting January 1, would become available to the states for obligation on December 1, instead of November 15 as expected.

Further, the fourth-quarter release will be made March 15, and the following quarterly release on July 1. Thereafter, Mr. Whitton said, the Commerce Department and its Bureau of Public Roads will release quarterly allotments on the first day of each quarter.

Opinions differ as to the potential effect. Some construction economists and highway officials regard the slowdown as unnecessary. The Highway Trust Fund is in a healthy condition and does not need protection against future disbursements to pay the federal share of the cost of projects as work is completed, they point out.

From the Administration viewpoint, the move does not make sense, says construction economist Robinson Newcomb. While the government is trying to encourage investment in productive facilities, private and public, action to slow completion of essential transportation links is shortsighted, in his view.

It is Mr. Newcomb's guess that the Treasury Department inspired the slowdown. As manager of the Highway Trust Fund, the Treasury is able to borrow from it, in accordance with the law, at low interest cost. As of September 30, the fund had a surplus of $273 million, of which $162 million was in 3% Treasury certificates.

Economist Newcomb agrees with highway officials that it will be extremely difficult, if not impossible, ever to remove the restrictions of contract controls (officially termed reimbursement planning) from federal-aid highway allocations. The controls were invoked when the Trust Fund faced (and actually incurred) a deficit that required borrowing from the General Fund, since repaid.

Highway officials of some states dislike contract controls, because the rationing by quarters hampers flexible scheduling of contract awards by highway departments. Mr. Whitton feels differently. On the basis of his own experience in Missouri, as chief engineer and chief administrative officer of the State Highway Commission, Mr. Whitton believes that an even flow of contract lettings is best for all concerned, the highway department, the contractors, and the materials suppliers, and that it produces lower bids.

He says, he saw no particular advantage in the early release during June, 1960, of the federal-aid allotments for both the first and second quarters of fiscal 1961, while he was still running the highway job in Missouri. The Administrator feels the same way about the advance release of quarterly funds in the spring and summer of 1961. Funds for the current quarter were released six weeks before October 1.

Two Steel-Frame Structures Fail

Two steel-frame buildings in New York State have run into trouble.

The nearly completed structural steel framework for a hangar building collapsed suddenly at the Oneida County Airport near Utica, N. Y.

Nearly 100 tons of trusses, columns, girts, purlins and bracing will have to be replaced. Preliminary cost estimate to repair all damage: $100,000.

Just before the framework collapsed John J. Vaughan, president of the general contracting firm, noticed that the side-wall columns appeared to be leaning. Shortly afterward the framework went crashing down in a direction parallel to the side walls, perpendicular to the direction spanned by the 120-ft steel trusses. No one was injured.

Permanent X-bracing for the side walls was on the site, but had not been erected. No temporary guy bracing had been installed. Bolting of trusses and side-wall girts was incomplete.

John J. Vaughan, Constructors, Inc., of New York City, is designer-builder. Central Steel Erecting Co., Inc., of Utica, erected the steel. Building owner is the American Management Association.

In Haverstraw, N. Y., two steelworkers were injured last week when part of the structural steel frame of a small one-story factory building collapsed.

A roof spandrel beam supporting two open-web joists of 50-ft span fell when a field-bolted column connection sheared. The collapsing framework also twisted some joists in adjacent bays. Bolting of the sheared beam-to-column connection was incomplete.

Steel erector is City Structural Steel of Brooklyn. General contractor is Jerry Mastromarino of Haverstraw, N. Y. Architect is Herbst and Rusciano of New York City.

Projecting Glass Wall Cuts Solar Heat and Glare

An extra glass curtain wall, projected 3 ft from the building wall, will shield the Municipal Office Tower in Norfolk, Va., from solar heat and glare.

Supported by lightweight aluminum tubing cantilevered from the exterior columns, the "sun-break" wall will function like a bather's sunglasses and beach umbrella, says the building's architect, Vincent G. Kling of Philadelphia. The exterior wall will consist of heavy-duty plate glass, tinted topaz to filter out heat and light.

A louvered aluminum canopy at each row of windows will screen the sun's direct rays and double as a window washer's walkway.

The municipal building is one of four buildings designed for the final phase of Norfolk's $15-million Civic Center (ENR Aug. 17, p. 32). A $4.5-million Public Safety Building was completed earlier this year.

Associated architects are Oliver & Smith of Norfolk; structural engineers are Fraioli, Blum & Yesselman of New York City.

Twin Towers to Rise In Downtown Detroit

Planning is under way for a 22-story, twin-towered office building in the center of downtown Detroit. The city's first skyscraper, the Majestic Building, is being demolished to make way for the new First Federal Building.

The $10-million building's twin floor plan has double the number of corner offices and more windows than a conventional rectangular plan. A service core will connect the two air-conditioned towers. Construction will start next summer.

Steel Tank Falls

Engineers probe collapse of 3-year-old structure

Engineers and city officials in Jackson, Miss., are puzzling over the collapse last week of a million-gallon elevated steel water tank only three years old.

It crashed at 3 am, causing about $100,000 damage to surrounding houses but injuring no one. Nobody witnessed the collapse.

The tank was cylindrical in shape, of welded design. It rested on 12 tubular steel columns on pile-supported concrete piers. It had a center riser for filling and discharge. From ground level to the bottom of the tank was 80 ft, to the water surface 110 ft. The tank was nearly full when it fell.

The investigators, including the city, its consulting engineers and the tank fabricator and erector, are withholding opinion at present.

Speculation centers on corrosion and structural failure.

City Commissioner Tom Marshall says he believes something happened to the bottom of the tank, causing the water to dump to the ground and wash the legs from beneath the tank. The water is reported to have hit the ground seconds before the steelwork fell. The structure dropped vertically, instead of toppling.

Mr. Marshall says the City Engineering Department found no sign of a foundation shift or fault.

There are unconfirmed reports of pops and groans heard for months before the crash and of badly corroded structural members observed after the crash. Heavy rain is reported to have fallen during several days before the failure.

R. D. Cole, Noonan, Ga., fabricated and erected the tank. The City contracted the foundation construction locally. The city's consulting engineer is Johnson & Young of Jackson.

Composite Beam Patentee Foregoes Royalties

Gregory Industries, Inc., Loram, Ohio, offers royalty-free licenses to users of stud-type shear connectors for composite construction.

Gregory's Nelson Stud Welding Division was awarded a patent last June covering this type of construction, in which shear is transferred from a concrete slab to a steel beam through studs welded to the beam flange. The company decided to forego royalties because "composite design has been proved a competitive design that is being used extensively for bridges and buildings . . . and since it is our aim to do everything possible to improve the competitive position of structural steel."

While office work goes on undisturbed . . .

Building Gets New Facade

Without disrupting the wire and radio services of the Radio Corp. of America, Uris Buildings Corp. is adding 29 stories to the 70-year-old RCA Communications Center on New York City's Wall St. At the same time, Uris is erecting two 39-story office buildings next to it. A 10-story steel jacket provides temporary protection for existing offices during replacement of the old masonry wall with a steel-and-glass curtain wall. New and old steel floor framing line up for 10 stories on two sides of the old building.

Mangla Dam Bids Are the Biggest

The bids opened last week for building the Indus Basin Project's Mangla Dam in West Pakistan will result in the largest single construction contract ever let.

A combine of U. S. firms headed by the Guy F. Atkinson Co., of San Francisco submitted the low bid of $354 million. Three other joint-venture groups, all dominated by U. S. firms but including foreign participants, also entered bids. Second low bidder was a group headed by Morrison-Knudsen Co. at $374 million. A Utah Construction & Mining Co. group bid $381 million, and a group sponsored by the J. A. Jones Construction Co. bid $461 million. The engineers' estimate, by Binnie, Deacon and Gourley of London and Harza Engineering Co. of Chicago, is said to have been about $380 million.

Seven other contractors joined the Atkinson company in making the lowest bid. They were S. J. Groves & Son's Co., Minneapolis; Walsh Construction Co., New York; Chicago Bridge & Iron Co., Chicago; Charles L. Harney, Inc., San Francisco; C. J. Langenfelder & Son, Inc., Baltimore; Ostrander Construction Co., Portland, Ore.; and R. A. Trippeer, Memphis.

Mangla Dam will be a 75-million-cu-yd earthfill with a maximum height of 370 ft, and will contain a concrete spillway able to discharge 1.2 million cu ft per sec (ENR Feb. 9, p. 31).

Mangla Dam's principal purpose is to store irrigation water from the upper Jhelum River watershed, which in accordance with the Indus Basin agreement will be transferred about 150 miles across country to the Sutlej River valley in large link canals on which bids will be received next spring. Mangla will also include a hydro power plant with an ultimate capacity of 1 million kw, this is a part of the contract.

The dam is a project of the West Pakistan Water and Power Development Authority, and is a part of the Indus Basin Treaty Program, whose financing is being supervised by the World Bank, with contributions from seven different nations—the U. S., Canada, Great Britain, West Germany, India, Australia and New Zealand.

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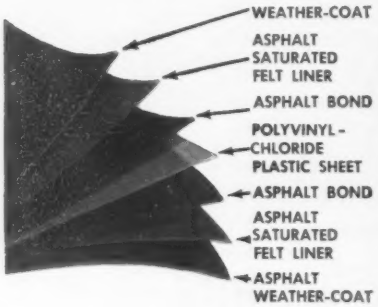

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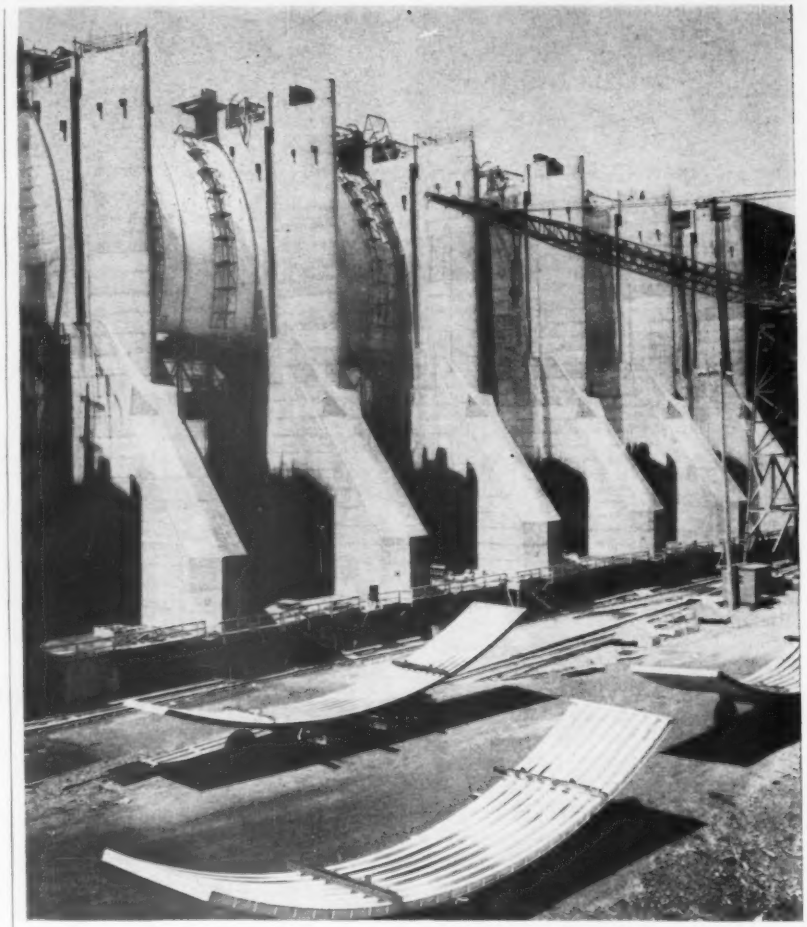


Towering buttressed piers provide Gothic look as . . .

John Day Gets Its Gates

The upstream face of the gated section of John Day Dam on the Columbia River stands ready as arc sections of the 64-ft-high spillway gates are positioned between the piers. With four years down and six years to go, John Day is beginning to take on some of its final appearance.

John Day Lock and Dam is on the Columbia where it forms the border between Oregon and Washington. The $418-million project, besides being one of the biggest construction jobs under way in the U.S. today, boasts some other superlatives too.

The 675-ft-long navigation lock rising on the Washington shoreline has a single lift of 113 ft—the world's highest. Initial powerhouse capacity will be a respectable 1.3 million kw, but ultimate installed capacity will total an impressive 2.17 million kw, just a hair shy of the nearly completed Niagara Power Project's record-setting 2.19-million-kw capacity.

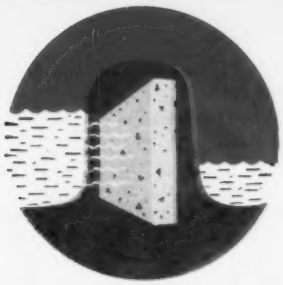
The $32.4-million, first-stage construction contract at John Day is heading into the home stretch. This entails partial completion of 19 of the 20 spillway bays (picture), the navigation lock, a short section of concrete gravity non-overflow dam, the north fish ladder, and a short earthfill embankment between the lock and the north shore.

And, since the 86-ft-wide lock will handle river traffic during second-stage construction before the reservoir is raised, the lock builders also cut a temporary channel leading to the upstream end of the lock.

River flow will pass through the spillway bays after the second-stage cofferdam is in place. Second-stage work includes the powerhouse, one spillway bay, and the south abutment and fish ladder.

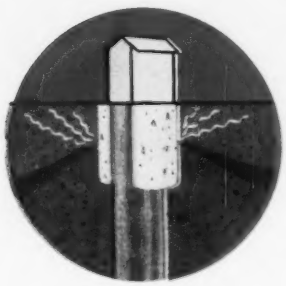
Prime contractor for first-stage work is Montag, Halvorson, McLaughlin & Associates. The Walla Walla District, Corps of Engineers is in charge.

HOW HALLIBURTON GROUTING VERSATILITY SOLVED THESE PROBLEMS



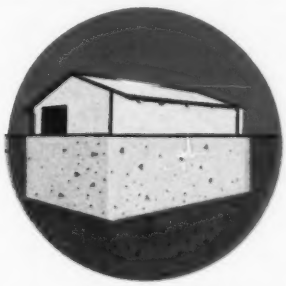
WATER RESERVOIR LEAKAGE

Irvine, Ky. – A reservoir adjacent to the Kentucky River was losing considerable water through permeable stratum beneath the reservoir dam. SOLUTION: Halliburton Pressure Grouting Service was engaged to build a cutoff "wall" through the permeable stratum. Grouting holes were drilled into the permeable stratum. Halliburton DOC (Diesel Oil Cement) grout was selected because of its ability to set almost immediately when contacted by water. Water leakage from the reservoir was completely halted.



SALT MINE WATER INTRUSION

Avery Island, La. – The wall of this 15′ x 20′ ventilation and access shaft, 508′ deep, is formed of open salt except for a concrete caisson lining the top thirty feet. Water had dissolved the salt behind the concrete at the caisson base, allowing water intrusion into the shaft. The water was dissolving and eroding the walls all the way to the mine floor. SOLUTION: Halliburton studied the problem and simulated these subsurface conditions for a long series of experimental injection tests prior to presenting a grouting plan for approval. It was decided to inject Halliburton Bloxall chemical grout at unusually low pressures and volumes to effect a water-tight seal between the salt dome and overburden without adversely affecting the salt, and to consolidate the fine water-bearing sand surrounding the shaft. Two concentric perimeters of grouting holes were drilled around the shaft. Pipe was placed in the holes and perforated at carefully selected depths with Halliburton's perforating tool. Accurate injection pressures were maintained at exacting levels by Halliburton's versatile six-plunger grouting pump. Pressure tests and observation after the job determined that the shaft was dry following this treatment and indicated that the surrounding formation was consolidated.



COMPRESSOR STATION VIBRATION

Wichita, Kan. – Excessive vibration in this compressor station building and surrounding area was apparently being caused by harmonic action of the compressors plus the inability of loose sand underlying the foundation to adequately anchor the structure. SOLUTION: A pattern of grouting holes were drilled through the floor of the building and into the unconsolidated sand formation. Halliburton Chemical grout was selected because it was necessary to actually penetrate the pore spaces of the loose sand. Following the chemical grout placement through perforations, the loose sand was consolidated and tied together, thus eliminating the damaging effects of vibration on equipment and protecting gas lines leading into the building.

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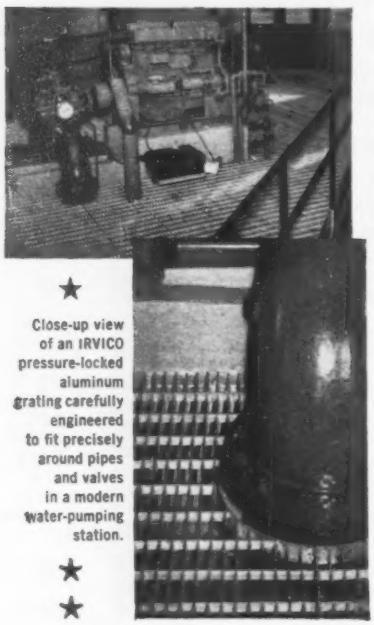

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Around the World . . .

• **Tunnelers challenge diesel ban**—Washington State's ban on fuel-burning equipment underground is under attack in court from the Washington Public Power Supply System and the Spokane Chapter of the Associated General Contractors. They want an interpretation of state statutes that will allow use of diesel equipment to excavate a tunnel for the power agency's Packwood Lake hydro project.

• **Atomic accident on purpose**—Letting a full-size nuclear power reactor run wild and melt down is the serious suggestion of Miles Leverett, a nuclear engineer for General Electric at Hanford, Wash. His idea, proposed at the Atomic Industrial Forum in Chicago, was that a carefully controlled and observed "accident" would fill many gaps in our present knowledge of nuclear safety practices.

• **Boston's tunnel**—The $29-million, two-lane vehicular Callahan Tunnel, which extends for more than one mile under Boston Harbor, opened five months ahead of schedule (ENR Sept. 8, 1960, p. 32). The tunnel parallels the heavily congested Sumner Tunnel, which will be closed for repair work totaling $1.5 million.

• **International pollution conference**—The First International Conference on Water Pollution Research will be held in London Sept. 3-7, 1962. The U. S. sponsor is the Water Pollution Control Federation. For more information, write: W. W. Eckenfelder, Jr., Manhattan College Environmental Engineering Research Laboratory, located in Englewood Cliffs, N. J.

• **Prestressed flight**—The Fourth World Conference on Prestressed Concrete, in Rome and Naples, May 28 through June 2, 1962, is organizing a three-week air tour of Europe. For information write: Jack Meehan or Bill Pittillos, 4748 Del Rio Road, Sacramento 22, Calif.

• **Low bridge**—Nebraska and Iowa may request vertical clearance of only 45 ft in bridging the Missouri River between Omaha and Council Bluffs. This would be a 7.5-ft reduction from present Corps of Engineers requirements for bridge clearances on the Missouri between Kansas City and Sioux City.

• **Scenic view**—Two new sections of the four-lane, $15-million Niagara Parkway are open. A three-and-a-half-mile section, upstream from Niagara Falls, connects with a one-mile strip opened in 1960, which passes the American Rapids. The other section, a two-and-one-half-mile strip downstream from the falls, includes a viaduct over the Whirlpool Rapids Bridge approach.

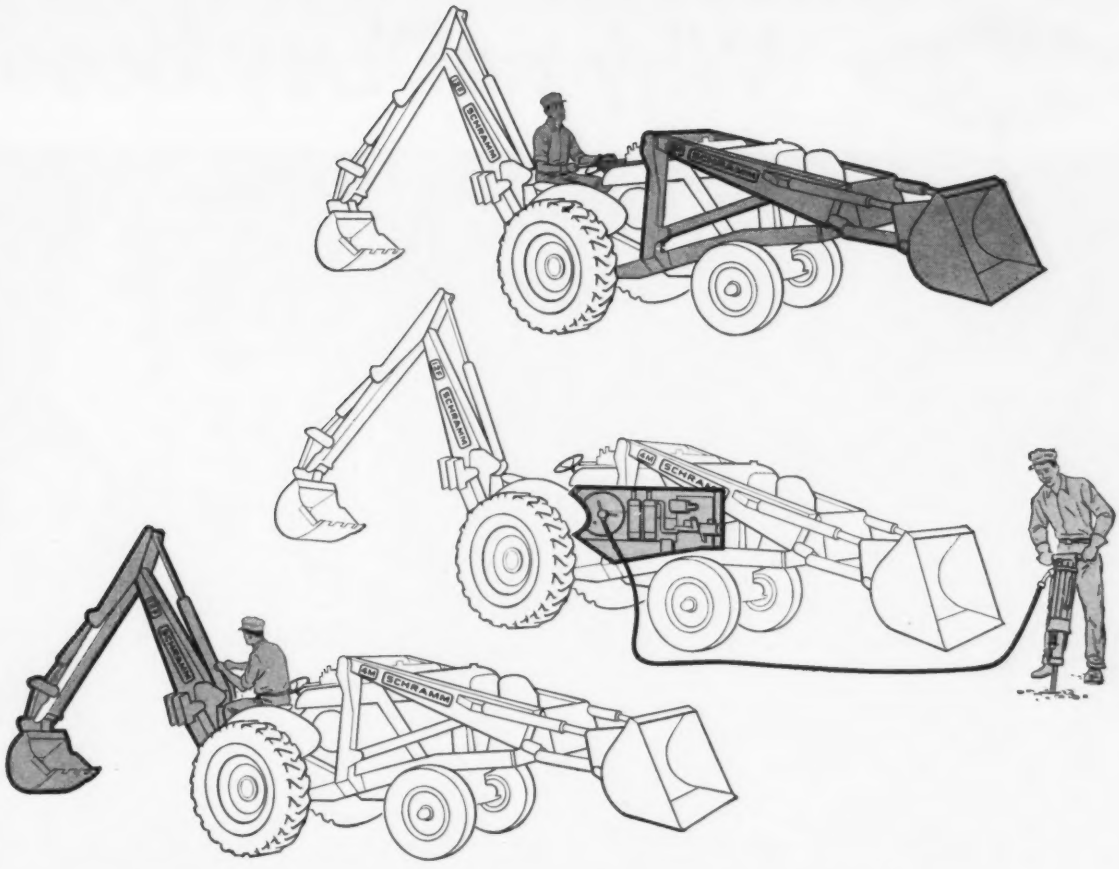
• **Runways for Vietnam**—The U.S. will spend $8.5 million for the construction of two jet runways in Vietnam. One, at the Bien-Hoa Airport near Saigon, will cost $5 million; the other at Rourane Airport in central Vietnam, will cost $3.6 million. Construction will be supervised by the Navy Bureau of Yards and Docks.

• **Calling all exhibitors**—The exhibitor's brochure for the 1963 Construction Equipment Exposition and Road Show features a plan to hold down mounting show costs. The show will be held at the International Amphitheater in Chicago, from Feb. 23 to Mar. 1, 1963. For copies of the brochure write: Construction Industry Mfgrs. Assn., 135 LaSalle St., Chicago 3, Ill.

• **Iberian highways**—The Ministry of Public Works in Spain will spend $300 million during four four-year stages of a national highway improvement program. The first phase, to cost $40 million, will aim at making Spain's 50,000-mile road network safe. The remainder of the program will include major changes in design, structures and surfacing, with more double-lane highways and freeways.

• **Birth of a berth**—Construction of a $5-million steamship terminal at New York City's Pier 94 will begin next month. A bulkhead cargo shed will link the finger pier to Pier 92, when completed in 1963. The Cunard Line has a 20-year lease from the city for the terminal, for an estimated rental of $350,000 a year.

• **Caution on shelters**—California Division of Industrial Safety warns homeowners to get the advice of an experienced engineer before building their own fallout shelters. "They may be literally digging their own graves," the Division says and points out that 15 California workmen are killed every year on excavation jobs.



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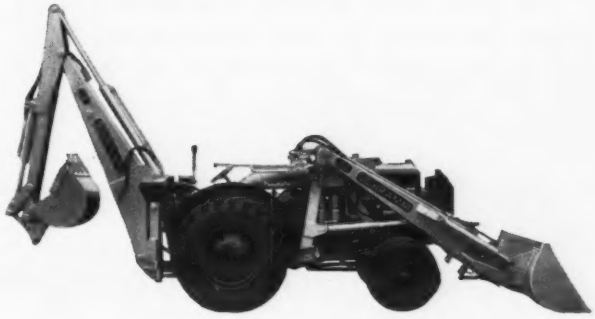

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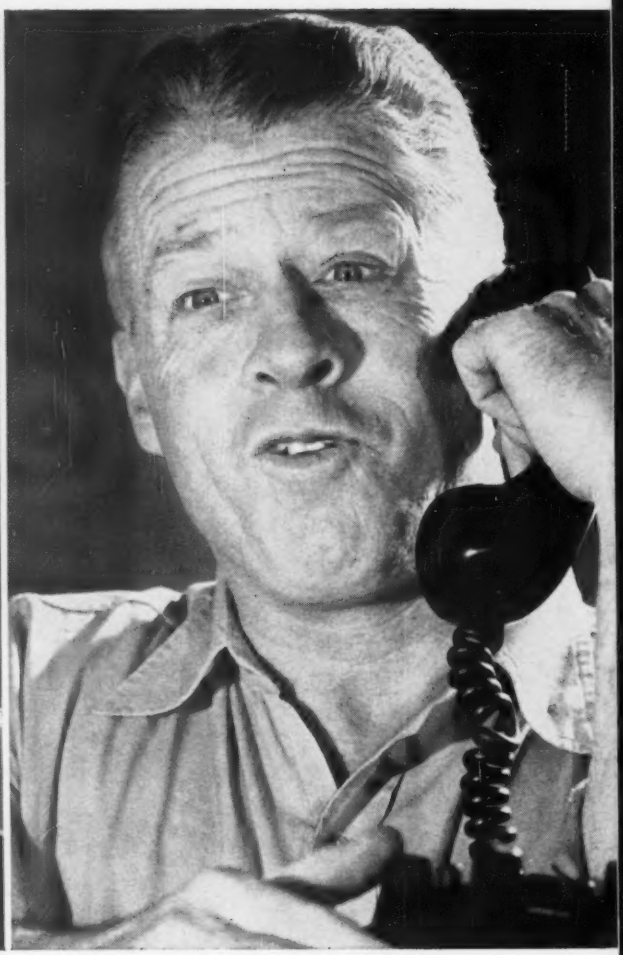

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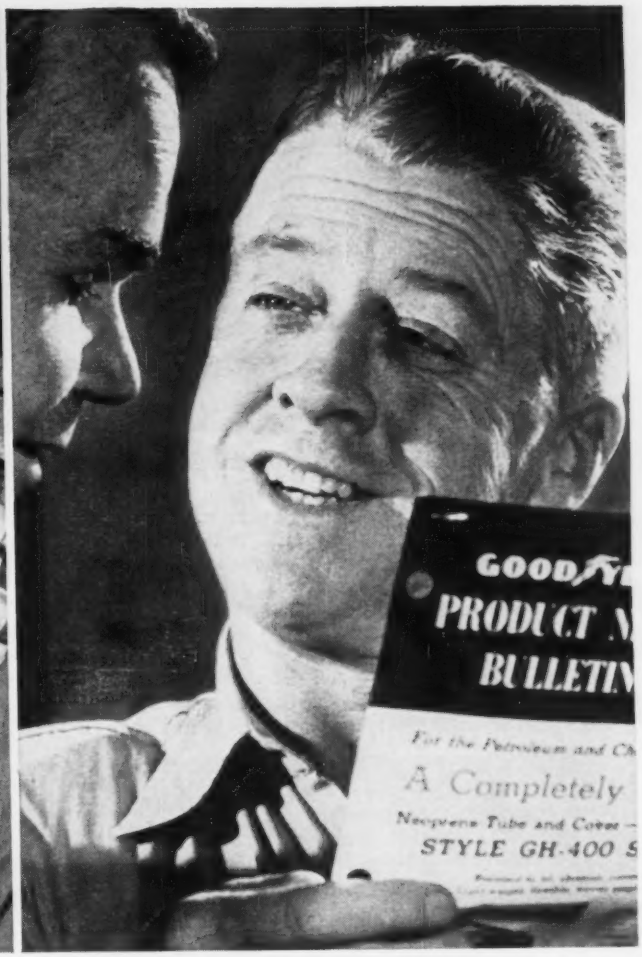

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One of the Great Crossings—The

The unusual is usual, and superlatives are commonplace to builders of the 17½-mile, $200-million bridge-tunnel crossing of lower Chesapeake Bay.

A long-time dream come true, it is one of the boldest over-water projects ever undertaken in North America (ENR Aug. 11, 1960, p. 27.)

The bridge-tunnel is under construction in what amounts to open ocean. Even in good weather, long, heavy swells roll in from the Atlantic to batter the job site. In rough weather, the shallow waters of the bay can become a maelstrom of high waves, vicious currents, and flood tides whipped to a frenzy by howling winds.

To meet the design and construction challenges of this great project, engineers and builders are using lessons learned on many notable projects of the past, both in the U. S. and abroad.

No. 1 lesson—tie every major piece of equipment engaged in a precision-type operation to something solid. This precept has lead to the development of several notable and unusual pieces of equipment designed specifically for this project (ENR July 6, p. 24).

Included among the special rigs is a DeLong-type "floating island," a platform that floats into place, then jacks itself out of the water on four spuds. Contractors use this device to handle and drive the prestressed concrete piles. There also are three enormous self-contained platforms used to install the deep foundations for the steel bridges.

The "two-headed" monster is a steel-girder traveler that moves along the trestle pile bents. It carries a pile cut-off frame at one end and a cap setting and jacking rig at the other. Following along the trestle is another traveler that is used to handle and place the deck girder units.

The validity of this approach was demonstrated last September, when hurricane Esther took a vicious sideswipe at Chesapeake Bay. All the special rigs came through unscathed; floating equipment was moved to safe anchorages before the fury of the storm struck.

The storm damaged one pile test platform, washed away some smaller stone on one of the partially completed man-made islands and put the initial tunnel section—then being sunk—in a drydock for repairs.

Complementing the special equipment is one of the greatest collections of floating equipment ever seen on a marine construction project. Total value of new equipment on the job is estimated at about $15 million.

Trestles, bridges, causeway and

• **Major crossing elements**—Four major elements make up the two-lane crossing (see map):

• Nearly 12 miles of low-level trestle that incorporate prestressed concrete cylindrical piles; precast pile caps; and 75-ft-long prestressed deck units.

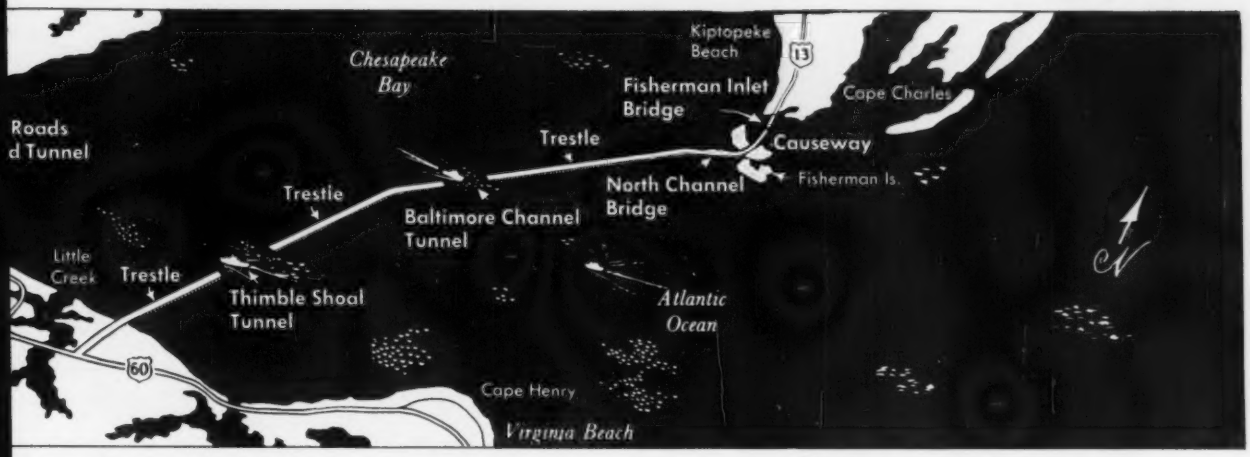
• Two trench-type tunnels made up of prefabricated steel-and-concrete sections. These tunnels pass under the two main navigation channels, Baltimore Channel and Thimble Shoal Channel. Each tunnel will be slightly more than 1 mile long.

• Four man-made islands that support the tunnel ends, provide space for approaches, ventilation and emergency equipment buildings. Each island is

Low-level trestle comprises over 12 miles of the crossing.

Dredged sand goes into one of four

Chesapeake Bay Bridge-Tunnel



tunnels will provide fast connection between Delmarva peninsula and Norfolk region.

about 230 by 1,500 ft in plan, rises 30 ft above mean low water, stands in from 30 to 50 ft of water.

• Two high-level, fixed steel bridges, one over the North Channel, the other over Fisherman Inlet. Foundations for these structures are reinforced concrete, bell-bottom piers on steel H-piles.

In addition, the Chesapeake Bay Bridge and Tunnel Commission will build a 9,000-ft-long earth-fill causeway across Fisherman Island. There will be about 5 miles of new highway built to connect the crossing to existing routes. Still under development are plans to build an ultra-modern restaurant on one of the islands, plus fishing facilities at one or more of the islands.

The bridge-tunnel will connect the eastern shore of Virginia (Delmarva peninsula) with the Hampton Roads-Norfolk area, forming a link in the popular Ocean Highway (U. S. 13) and replacing the existing ferry service.

Connecting with major highways to the north and south, use of this route permits the traveler to by-pass the congested Baltimore-Washington area. Traffic during the first year after completion is estimated to reach 5,000 vehicles per day (compared with 1,900 that now use the ferry).

• **Participating firms**—Four major contractors, in joint venture, are building all of the crossing except the superstructures of the two high-level bridges. The four firms are Merritt-Chapman & Scott, New York City; Raymond International, Inc., New York City; Tidewater Construction Corp., Norfolk (sponsor); and Peter Kiewit Sons' Co.

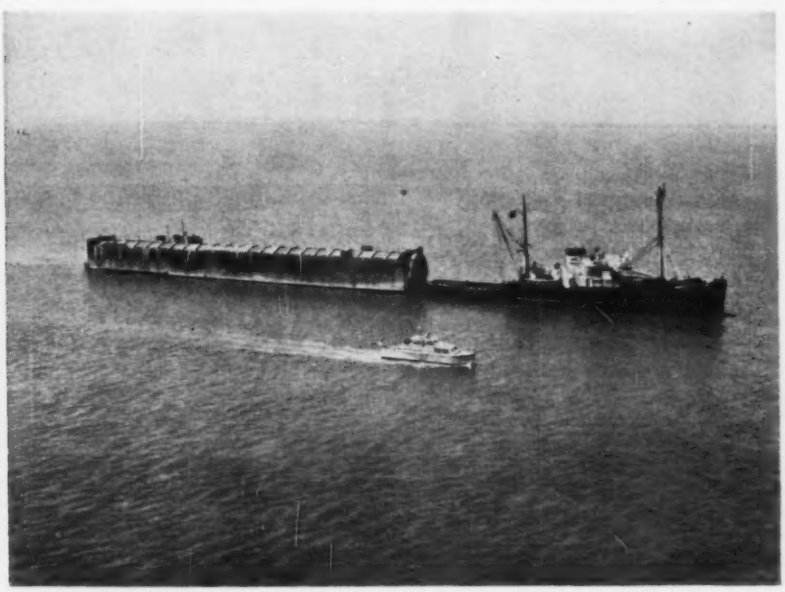
M-C & S is building the man-made islands and the tunnels.

American Bridge Division of U. S. Steel Corp. will erect the steel bridge superstructures.

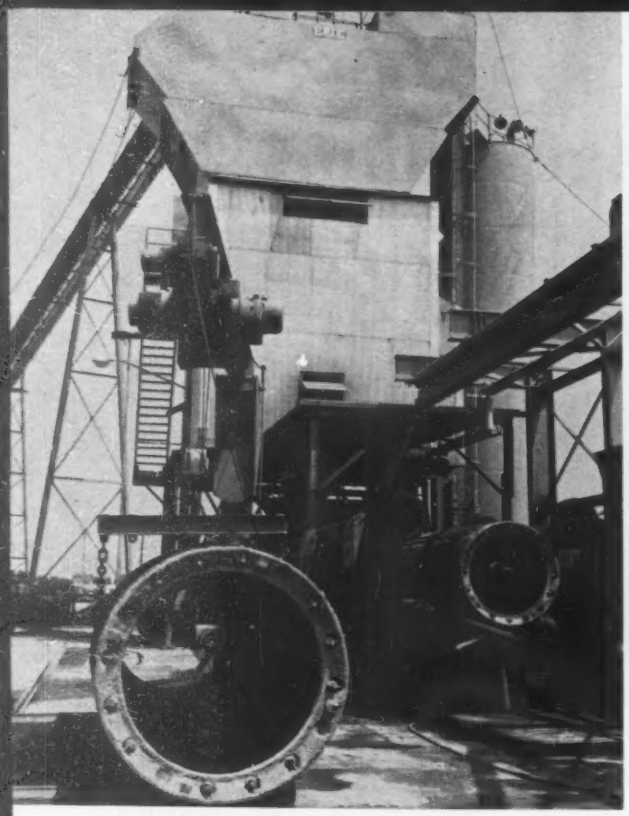
Consulting engineers Sverdrup and Parcel, St. Louis, Mo., designed the crossing and are supervising its construction for the Commission. Wilbur Smith and Associates, New Haven, Conn., made the traffic and revenue forecasts.

(The Bridges—Next page)

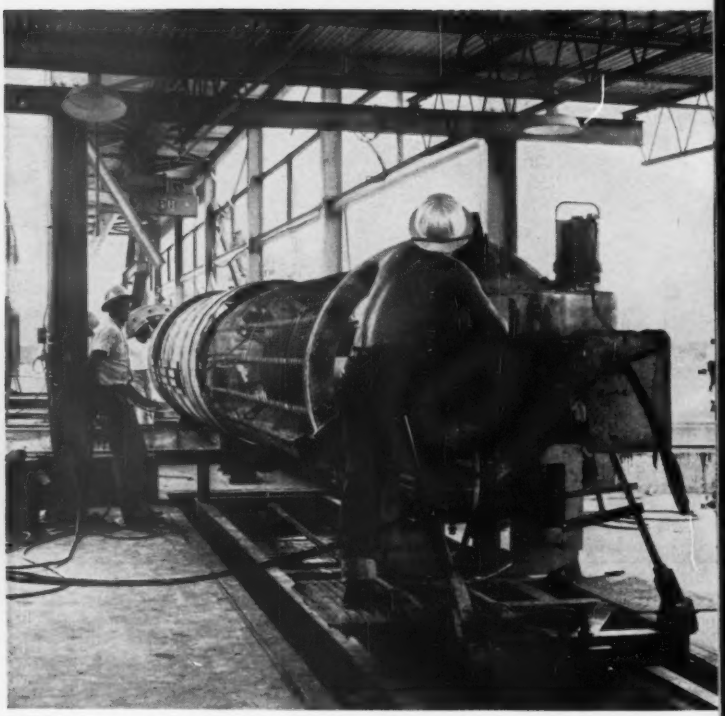
huge, man-made islands.



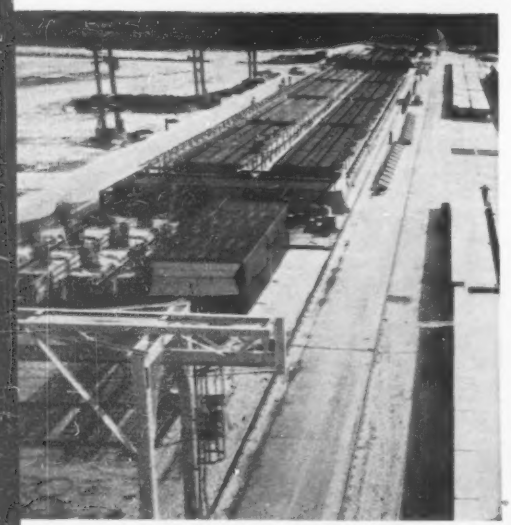
Prefabricated tunnel section moves from Texas to Norfolk.



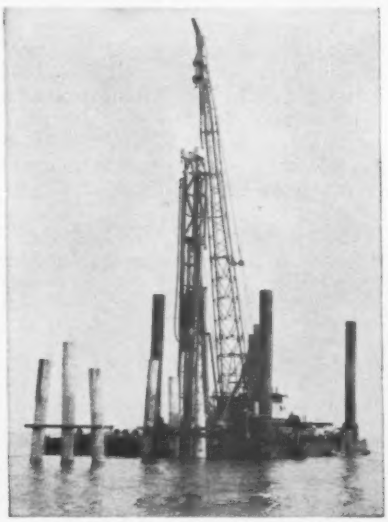
SPINNING PLANT produces concrete pile sections.



SPIDER on turntable inserts steel, rubber tubes in pile form.



TWIN BEDS yield prestressed deck units.



GIANT RIG drives prestressed piles.

TWO-HEADED MONSTER straddles bents.

. . . The Bridges—Concrete and Steel

The low-level trestle follows the great design and construction traditions of the Pensacola Bay Bridge (ENR July 21, 1960, p. 45), the Lake Pontchartrain Bridge (ENR Aug. 30, 1956, p. 30) and other long crossings.

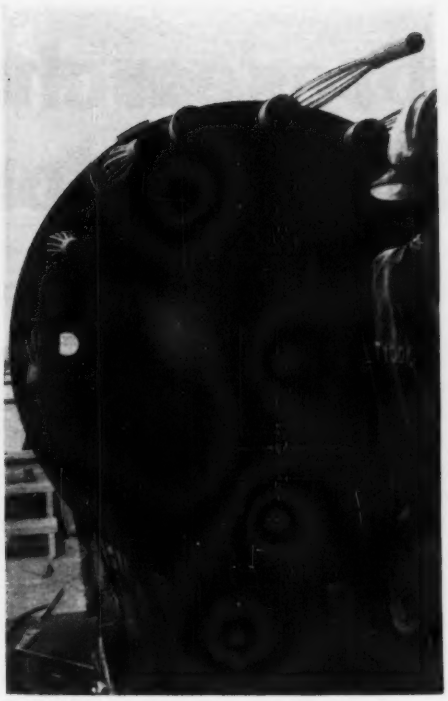
Each of the four trestles is made up of repetitive spans supported by pile bents. Each bent consists of three 54-in.-OD, prestressed concrete piles with walls 5 in. thick; the center pile is vertical, outside piles are battered. The piles vary in length from 80 to 170 ft.

A precast, reinforced concrete pile cap forms the top of each bent. Caps support 75-ft-long prestressed girder-and-slab deck sections. Four deck sections in each span form a roadway 28 ft wide with an 18-in.-wide safety walk on each side. The roadway will be 30 ft above mean high water.

• **Precasting and prestressing**—Tidewater-Raymond-Kiewit (TRK) formed the Bayshore Concrete Products Corp. and built a $3.5-million permanent casting yard at Cape Charles, Va., near the north end of the project. Bayshore's layout is compact and efficient. It incorporates a complete automated batching plant with a capacity of 150 cu yd per hr, and a rail gantry crane of 100-ton capacity.

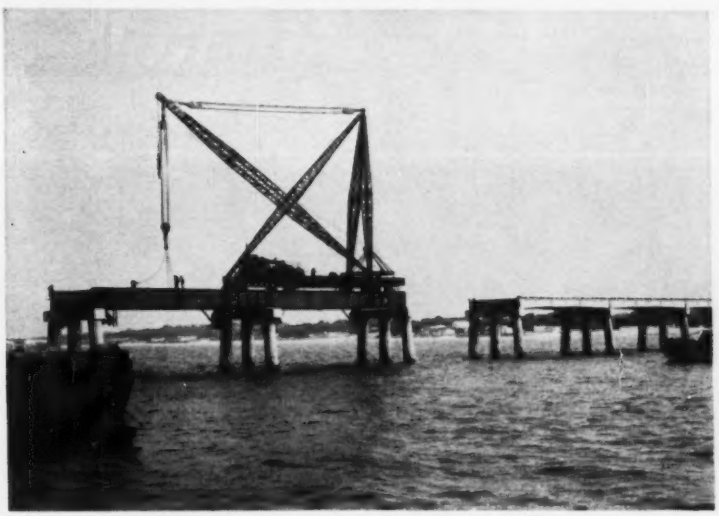
• **Piles**—The prestressed cylindrical piles are practically the same as those at Mandeville. Here's how they are mass producing them at Bayshore:

First step is to insert a cage of con-



CABLES stress multi-section concrete pile.

RAIL GANTRY with lifting yoke handles precast concrete pile cap.



TRAVELING DERRICK moves on steel girders to place deck units.

PLATFORM is base for foundation construction.

ventional reinforcing steel and rubber tubes to form ducts for the prestressing cables into a 16-ft cylindrical steel form. Bayshore engineers devised a collapsible spider on a rail-turntable (see picture) to insert the assembly (and to withdraw the rubber tubes after casting).

The shell then rolls to the casting area, is picked up by an overhead crane and placed in the patented Cen-Vi-Ro spinner. A shuttle conveyor places conventional concrete in the shell.

After spinning, an overhead monorail crane moves the form and concrete into a steam chamber. Each section rolls through the chamber, curing for about 2 hours, or 2,000 psi.

Each section is taken from the steam chamber and the rubber tubes removed. A fork-lift truck then moves the section to a storage area, where it stands vertically to cure for 28 days.

To make a pile, workers line up as many sections as needed on a long assembly bed, like beads ready for stringing. Contact surfaces between adjacent sections are brush coated with an epoxy adhesive.

Workmen then string the stressing cables through the ducts, stress them with Freyssinet jacks, grout them in place and burn them off with a torch.

The 100-ton rail gantry picks up each pile, loads it on a barge for movement to the job site.

Pile caps are conventionally reinforced, cast in forms, steam cured and stored. Spiral cages extending from the bottom of each cap fit into the driven piles to tie the piles and cap together.

• **Deck units**—Bayshore built two long, parallel casting beds to mass-produce the prestressed deck units. Each bed

(Story continues on p. 38)

New from plywood research: that helps you build for

THE RIGID FRAME, newest building system from Douglas Fir Plywood Association research, is the simplest, most economical way to enclose space. Costs well below $1 per sq. ft. have been reported for the basic building shell. The system is fast, too. Each of the 52x100-ft. warehouses below took only 11 days to complete.

Basic unit is a load-bearing arch made of four lumber members, rigidly connected by nailed plywood gusset plates. The system owes its strength and economy to these plywood gussets. They do the job as well as, or better than, costly metal connectors, and insure an absolutely rigid connection. Series of the rigid frames—up to almost any number—are sheathed and tied together structurally by Exterior (waterproof) plywood walls and roof.

The rigid frame system requires little in time, materials and capital outlay. Frames are easy to assemble, off-site or on, and are quickly set in place. Construction grade West Coast lumber and DFPA quality plywood are used. The system is ideal for pre-cutting or pre-assembly. It takes fewer pieces and less work than trusses, and gives more usable space.

And it's versatile. DFPA engineers have developed building plans for spans of 32′, 40′ and 52′. Several hundred variations in the basic design can be engineered from research information available from DFPA. Variations include different leg heights, spans, frame spacing, roof loads and wall treatments.

The rigid frame design originated from research efforts to develop a low-cost farm building. But the long clear span makes it extremely logical for warehouses, garages, commercial and public buildings, and even residential construction. For more information on the rigid frame system, or for construction plans, write (USA only):

DOUGLAS FIR PLYWOOD ASSOCIATION
TACOMA 2, WASHINGTON
—a non-profit industry organization devoted to research, promotion and quality control

Always specify by DFPA grade-trademarks

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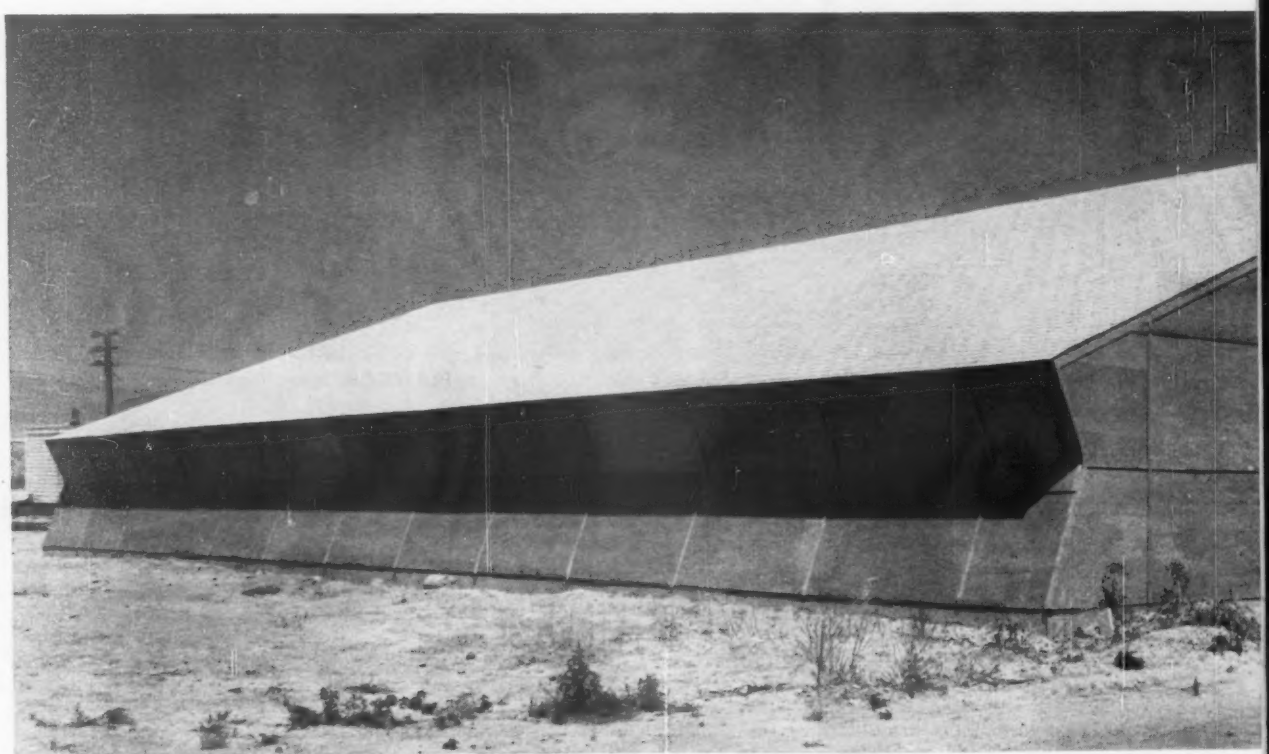
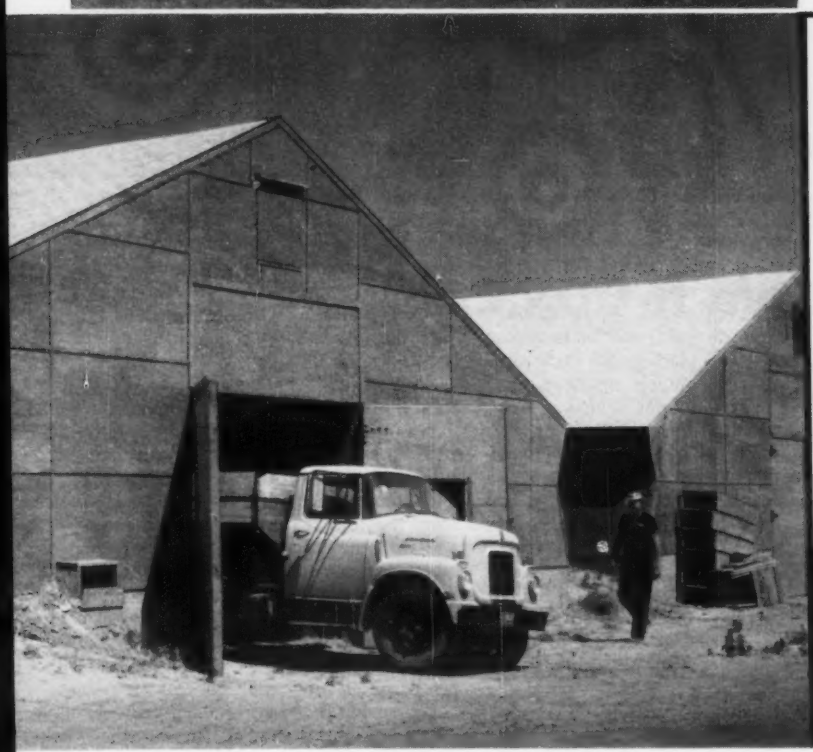
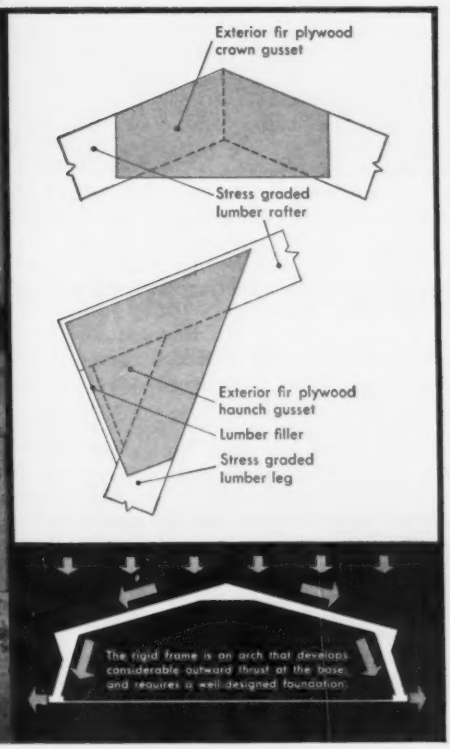


a simple construction system less than $1 per sq. ft.

The rigid frame farm building below, 40 x 225', was built in Western Washington for under $1 per sq. ft. Frames, which were built in a jig on the site, are 2 x 10's with gussets of ⅜" Exterior C-C plywood. Siding and roof sheathing are also Exterior plywood. Openings were left in siding to admit light and air.

On this rigid frame warehouse, Exterior plywood siding was unpainted and asphalt shingles went over the plywood roof sheathing. In some applications, sides may be straight instead of sloping in. To design these and other variations, refer to DFPA's basic design data on the rigid frame.




Exterior fir plywood crown gusset
Stress graded lumber rafter
Exterior fir plywood haunch gusset
Lumber filler
Stress graded lumber leg
The rigid frame is an arch that develops considerable outward thrust at the base, and requires a well-designed foundation.

handles four 75-ft-long units, the number required for a single span. At top rate, Bayshore can cast the units for two complete spans every day.

The deck units are pretensioned by ½-in.-dia, 7-wire steel strands. Each strand extends the full length of the casting bed, is cut after the concrete has been cast and steam cured in place for about 20 hours. The strands are then cut and the separate units, which weigh about 60 tons each, stored in the yard for additional curing.

• **Pile driving**—A 100-ton whirly crane on one end of TRK's floating island picks each pile from a barge and positions it for driving. An adjustable-stroke, single-acting steam hammer in a specially designed set of universal driving leads mounted on the opposite end of the island drives the piles. Engineers designed the leads so that the hammer can roll back into a pocket at the top of the leads, out of the way.

Driving is a precision operation, since tops of the 54-in.-dia piles must be within 3 in. of the specified location at cut-off elevations. The hammer has a maximum energy of 82,500 ft-lb (25,000-lb ram, 3.3-ft drop).

Crews are now driving piles with 50,000 ft-lb (25,000-lb ram, 2-ft stroke). Two 12-in.-dia water jets extending to within 20 ft of the pile tip supplement driving. After driving, crews fill each pile with sand to within 4 ft of the top.

• **Two-headed monster**—The two-headed monster is a traveling bridge that mounts a stiff-leg derrick at each end. It is about 175 ft long, more than two spans of the trestle.

The monster travels on wheel assemblies mounted on bonnets temporarily set on each of the two outside piles in a bent. Rails on the underside of each main girder of the bridge move over the wheel assembly as the rig is moved forward under the pull of a line from one hoist engine connected to the bent behind. The bridge is always supported by two bents and balanced so that no counterweight is needed. Bonnets and wheels are interconnected transversely by hydraulic jacks.

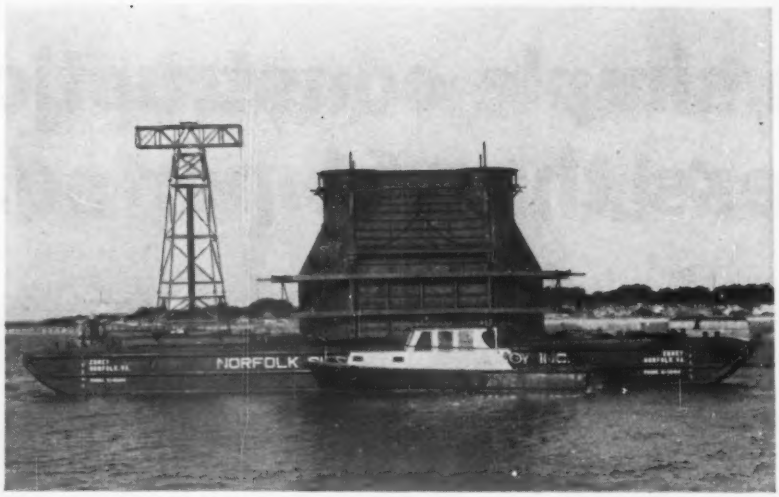
At one end of the monster, crews use two jack hammers mounted on a rotating ring to cut off the pile at the correct elevation. The ring sits on a specially designed frame that fits over the upper end of the pile. Stressing cables and reinforcement are torch cut.

At the other end, the derrick places the pile cap on the bent, then casts the concrete plug that fills the top of each pile and the corresponding hole in the cap, ties the cap and piles together.

• **Placing deck units**—TRK designed another traveler to place the deck units on the pile bents. This rig is a 75-ton stiff-leg derrick on steel box girders resting on falsework between bents.

There are two sets of steel falsework, comprising two box girders connected by lateral members and bracing; each set of falsework extends across one span of the trestle. The stiff-leg derrick first sits on the falsework adjacent to an open span, places the deck units in that span. It then moves ahead on the falsework to the next span, picks up the falsework from the span just vacated and places it on the next span ahead. This process is repeated span by span as the trestle is extended.

Finishing operations on the deck will include casting and stressing the transverse diaphragms, installing guard rails, lighting fixtures and telephones. The contractors will apply an asphalt wearing surface as a final step.



BELL-BOTTOM CAISSON will go into foundation of the North Channel Bridge.

• **The steel bridges**—The 17-span North Channel Bridge is 3,795 ft long, including approaches, and provides 300-ft horizontal clearance and 75-ft vertical clearance. The main channel span is a 325-ft, curved chord, simple through truss. Approach spans will be four-span continuous steel plate girder deck units with reinforced concrete roadway.

The Fisherman Inlet Bridge is 1,356 ft long, including approaches, provides 110-ft horizontal clearance, 40-ft vertical clearance. Main structure is a three-span continuous welded deck plate girder. Approaches are concrete trestles similar to the low-level trestles.

• **Foundations**—Foundations for North Channel Bridge have bell-bottom caissons (cans) similar in design to those used a decade ago on the bridge over upper Chesapeake Bay at Annapolis, Md. (ENR Oct. 26, 1950, p. 32). The Fisherman Inlet structure rests on piles.

To build the North Channel Bridge piers, TRK engineers designed three floating platforms. Each platform is self-contained, carries a 75-ton, stiff-leg derrick, boiler, three-drum hoisting engine, pile leads, change room and office. Steel piles incorporated in the corners of the platform are driven into the bay bottom to anchor the platform in position for work on each pier. To move to a new location, crews first pull the piles. Tanks incorporated in the platform provide buoyancy, and derrick boats half lift, half tow the platform to the next pier. The corner piles are then driven, and work begins on another pier.

TRK crews carry out a carefully planned sequence of operations to build each pier. Here's how they do it:

First step is to excavate a level area on the ocean bottom. Then timber falsework piles are driven to support a precast concrete template, plus first stage steel forms and concrete.

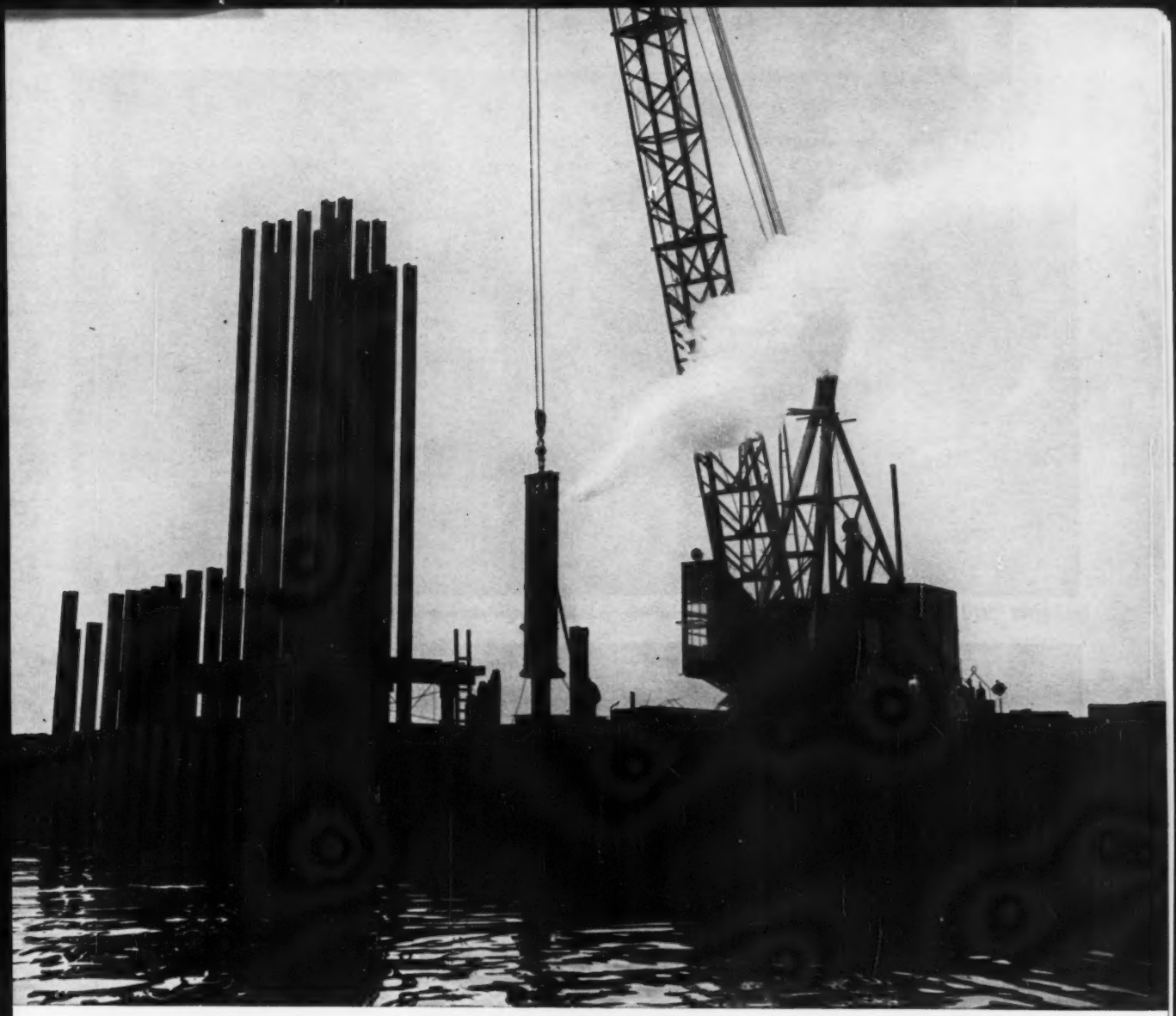
Crews then lower the large, flat precast concrete template to rest on the timber piles. The template has openings to accommodate and guide steel H-piles that are driven through it to bearing beneath. The 14-in., 89-lb H-piles are driven to 80-ton bearing; some are as long as 170 ft.

With the steel piles in place, workmen lower two circular steel cans about 10 ft high to rest on the concrete template (and over the tops of the steel piles). They then partially fill the cans with tremie concrete to transfer the load from the timber piles to the steel piles.

Next, they place the bell bottom, which extends to elevation −5, and fill it with tremie concrete. Bells (and piers) vary in size. One of the largest is bottomed at elevation −70; top of that pier is at about +75. Bell for that pier is 62 ft wide at the bottom.

Next step is to place an oversize steel ring form on top of the bell pier; the ring extends from elevation −5 to

(*The Tunnels—p. 40*)



Steel H-piles support piers for 5,700-ft Massachusetts bridge

The new Taunton River bridge, between Fall River and Somerset, Mass., required 26 piers, 23 of which rest on steel H-piles driven to bed rock. The new six-lane high-level bridge will be 5,700-ft long, largest of its kind undertaken by the Massachusetts Department of Public Works.

Bethlehem supplied 10,000 tons of H-piles up to 150-ft long for 14 river piers and 9 land piers. Bethlehem also supplied 1,200 tons of sheet piling for single-wall cofferdams, used in constructing the river piers.

Dravo Corporation is general contractor for the substructure.

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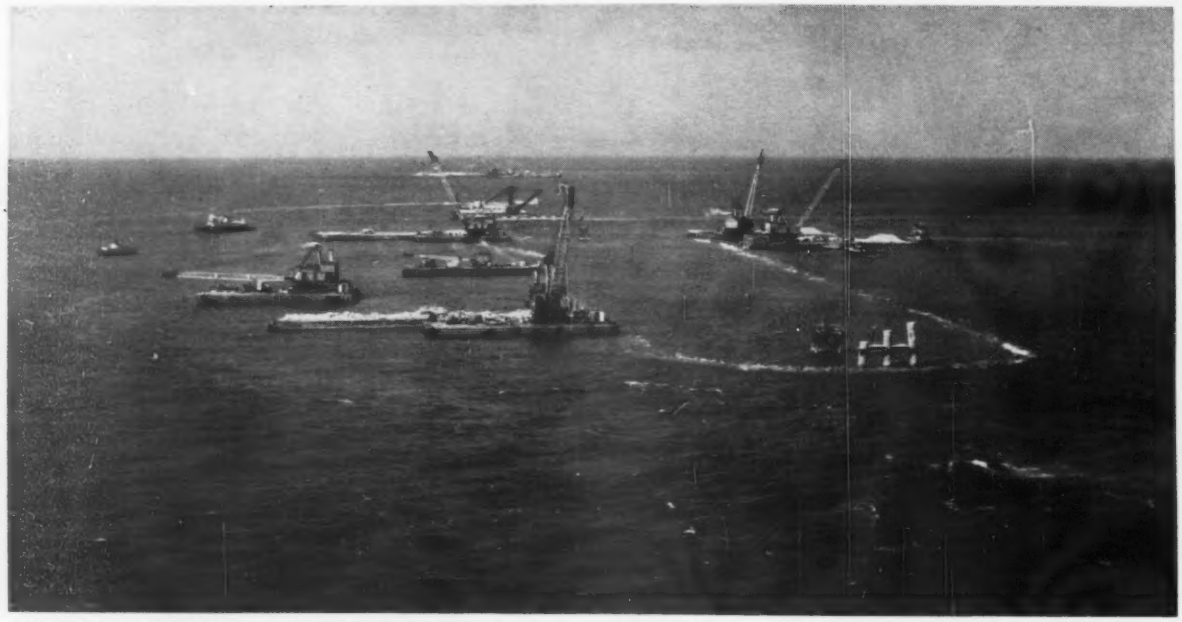
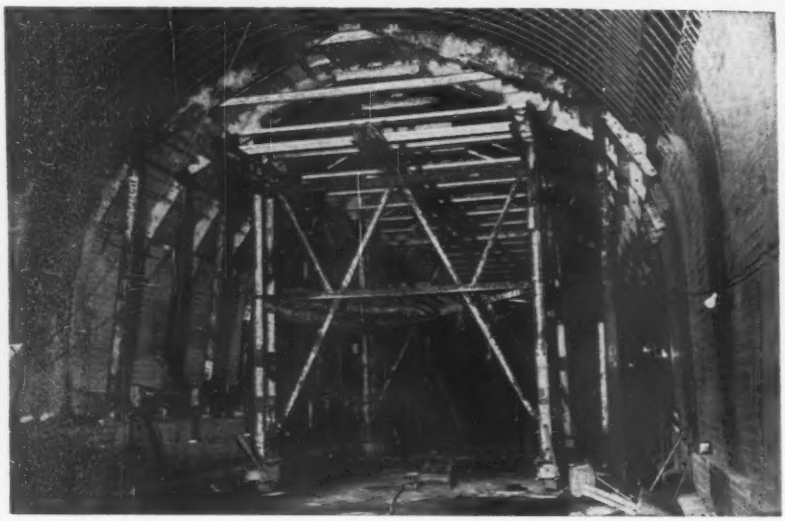


MARINE EQUIPMENT swarms at the site of one of the man-made islands emerging from Chesapeake Bay.



ROLLING FORMS are used to place concrete in arch of tunnel section.

DERRICK FEEDS CONCRETE to interior of tunnel section in shape-up basin.

. . . The Tunnels –

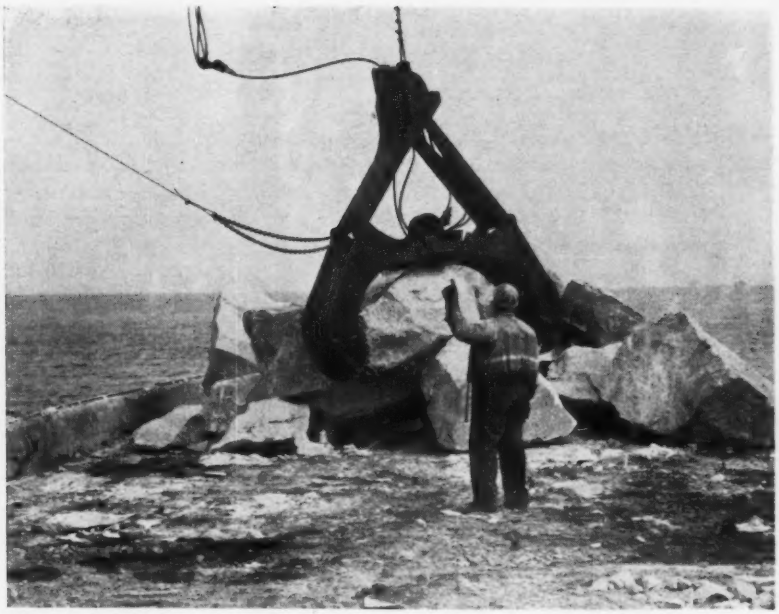
about +6. It serves as a cofferdam, is pumped out to permit construction of two tapered circular pier shafts in the dry. The shafts are built in a conventional manner with re-usable forms.

Merritt-Chapman & Scott Corp. is battling weather and water to carry out these major steps in building the two trench-type tunnels at Chesapeake Bay:

- Creation—from scratch—of four islands in 30 to 50 ft of water.
- Sinking, joining and finishing the tunnels after the 37 individual tunnel sections have been outfitted at a Norfolk dock.

Most exciting and difficult of these, say M-C&S executives and engineers, are the islands. Their construction is a tricky operation almost without precedent in the annals of subaqueous tunnels. M-C&S should know. Since World War II, they have built four trench-type highway tunnels in the U. S.–Washburn tunnel at Pasadena, Texas, and three in and around Chesapeake Bay—the first Elizabeth River tunnel between Norfolk and Portsmouth, the Hampton Roads tunnel connecting Norfolk and Hampton, and the Baltimore Harbor tunnel.

- **Creating islands**—Each island is a truncated pyramid built up from the bay bottom to elevation +30. In cross section, each island is a trapezoid with rounded ends; average width at the top is about 230 ft, over-all length nearly 1,500 ft. Outer slopes are gradual, with the bottom of each island covering a much greater area than the top.



HEAVY RIP-RAP in chunks weighing more than 10 tons goes into island dikes.

Steel and Concrete

The core of each island is hydraulic fill (sand) dredged from nearby locations in the bay. The contractor will place about 5 million cu yd of hydraulic fill. Slopes are protected by layers of four different sizes of stone, ranging from "Gravel A" (125- to 1,000-lb quarry run rock) to "Heavy Rip-Rap" (minimum size of 10 tons). Heavy rip-rap is the final layer just below, at and above the water level. A 12-ft-high reinforced concrete splash wall extends all around the island (except where the initial section of each tunnel rests).

First step in construction is to establish pile ranges to provide a base line for spotting of the fill.

Then dredges begin placing the hydraulic fill on the bay bottom. Most of the fill is being pumped by one huge dredge, the "Ezra Sensibar." When the fill is about 17 ft below mean low water, crews begin placing the stone and rip-rap in layers on the outer slopes.

Barges bring the rock to the island site. Smaller sizes of stone are placed by clamshell buckets. Derricks with special "McCaffrey" buckets (see photo) place the heavy rip-rap.

The sequence of operations is to place the rock all around the perimeter of the island to create a dike several feet high. Fill is then pumped into the core of the island and retained by the stone layers. This process is repeated until the island is built up to full height. Over-all loss of material in building the islands has been surprisingly low, despite the heavy currents and uncertain nature of the work.

• **Sand drains**—Engineers ran into a major complication on the north island of the Thimble Shoal tunnel in the form of highly compressible soil layers beneath the bay bottom. They anticipated excessive settlement due to consolidation of these layers.

To solve this problem, a contract was let to American Dewatering Corp., Hackensack, N.J., to install nearly 3,600 vertical sand drains.

American Dewatering began work when the island reached elevation +8. Sand drains, 14 in. in dia, will penetrate to −82 to −95. Drains will be installed all over the island, but concentrated (4 ft c-c) beneath the site of the ventilation building.

After the drains are installed, M-C&S will build the island to elevation +38. After six months, any surcharge over +30 will be removed and the islands will be ready for construction of the ventilation building and other structures.

• **Tunnel sections**—Each tunnel comprises a series of prefabricated steel-and-concrete sections sunk in place, joined and finished under water.

Each tunnel section is about 286 ft long, is fabricated as a double steel shell, complete with reinforcing in place for the interior concrete lining. The interior shell is circular, 34 ft in dia; the outer shell is basically octagonal in cross section, some 37 ft wide.

The American Bridge Division of U. S. Steel Corp. fabricates the sections on shipways at Orange, Texas. They bulkhead the ends, fill the lower portion of the space between the inner and outer steel shells with concrete for ballast, and launch them like ships. Ocean-going tugs tow the sections the 1,700 water miles from Orange to the "shape-up" basin at Norfolk.

• **Outfitting**—At the shape-up basin, M-C&S crews completely line the interior of the tunnel section with concrete in a carefully planned sequence (invert, haunch, side walls and arch). They also cast the concrete roadway slab, install pipelines, and conduits.

With the interior outfitting done, workmen seal open hatches along the top of the section. On the two end sections of each tunnel that adjoin each island, they also install a cylindrical access hatch and forms for tremie concrete. Then they place additional concrete between the inner and outer shells, increasing the weight until the section is nearly awash.

They are then ready to tow the section into position for sinking, weather permitting.

• **Sinking and joining**—Before sinking a tunnel section M-C&S crews must prepare a bed for it on the bay bottom. They do this by making two passes of a screed dragged along the bottom by machinery on a special screed barge. They then place a 1- to 2-ft-thick layer of crushed stone on the bottom of the trench to serve as a foundation.

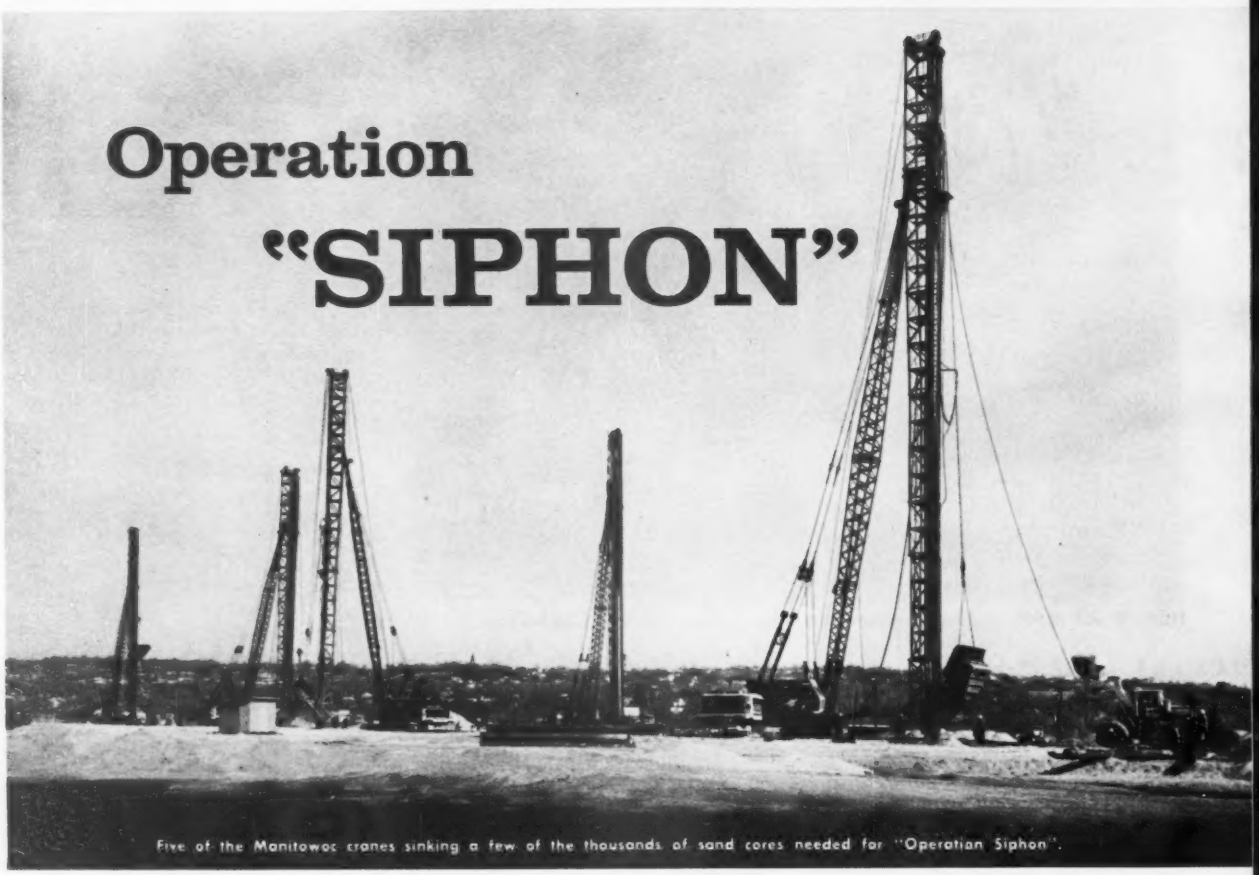
They will use floating derricks to place the two end sections of each tunnel in shallow water. Other sections will be placed by a new M-C&S rig—a converted T-2 tanker that mounts a pair of outriggers spaced about 180 ft c-c on one side. The barge carries a complete concrete batching plant, and bins for aggregate storage.

To sink a section, crews simply place a carefully calculated weight of concrete in the remaining space between the inner and outer steel shells. The sections join to one another by the mating of two pins welded to a collar on the upper half of one to slot plates on a collar on the lower half of the adjacent section.

Workmen tremie concrete the remaining voids between the shells of the steel section, backfill around the section and partially above it. Curved sections of steel sheetpiling slide into slots in the bulkheads to close the space between the two sections; this space is filled with concrete to complete the exterior seal. Backfilling can then be completed.

To complete the tunnel, work can begin at one end (or both). Workmen cut successively through the bulkheads and complete the inner joint concrete. In contrast with several of the previous tunnels, these have cast-in-place concrete ceilings. Final steps include application of ceramic tile to walls and ceiling, plus an asphalt surface on the roadway. Tunnels will have a roadway 24 ft wide between curbs, with 14-ft vertical clearance.

Operation "SIPHON"



Five of the Manitowoc cranes sinking a few of the thousands of sand cores needed for "Operation Siphon".

How Geo. M. Brewster and Son, Inc. use 8 Manitowocs to sink thousands of sand cores

Acres of marsh land near Teaneck, N.J. were recently drained of excess ground moisture by a unique method devised by Geo. M. Brewster & Son, Inc., Bogota, N.J. The drainage job was necessary prior to the construction of a portion of the Bergen-Passaic Expressway connecting State route 17 with the George Washington Bridge.

Brewster's method of converting water-soaked meadow land to a stable road bed reportedly represents savings of as much as $700,000 a mile. Basically, the unusual procedure consists of sinking thousands of sand cores which tend to "siphon" ground water from the area. The present strata is composed of rootmat on top, followed by peat, organic silt, crusty clay, dense glacier till, and red shale bed rock. Eight Manitowoc cranes — ranging in capacity from 80 to 125 tons — were moved in after 205,000 yds. of mushy topping had been replaced with sand fill. The sand was needed to provide a firm footing for the giant cranes.

Unusual Procedure

The Manitowocs were equipped with air hammers, compressors, additional rigging, and special sand skips. In forming the sand cores, 20" diameter casings of half-inch steel are driven by the hammer-mounted cranes to depths ranging from 60 to 135 ft. Casing tips have a hinged trap door, kept in a closed position by downward thrust, preventing clogging of the pipe as it is driven. When the casing reaches firm bottom, sand is forced into it under pressure of 100 P.S.I., compacting the column and forming a solid sand core. After air pressure is applied at the top of the pipe, the bottom trap door is forced open and the casing slowly withdrawn, leaving a perfectly-formed sand core.

Much in the manner of a wick, the core attracts ground water and "siphons" it to the surface. To aid this siphoning action, a second blanket of sand is laid over the entire area. Pressure, created by the weight of the sand blanket, forces below-level water to seek and follow the sand cores to the surface where runoff is carried by a network of drain pipes to the nearby meadows.

Manitowocs Fit Job Best

Mr. Ken M. Sterling, Superintendent in charge of the Brewster operation, said, "No other crane could do this type work as well and fast as Manitowoc." Because of the unstable ground condition found at the job-site, the outstanding stability of the Manitowoc cranes was an important factor. Every Manitowoc has an extremely low center of gravity with the counterweight placed low and far back. Huge, heavy, single-weldment carbodies also contribute to overall stability — are mounted directly on the crawler frames for rigid, unitized construction.

Unusually low ground bearing pressures, resulting from long, widespread crawlers, were important when traveling over the marshy ground. Without the "flotation" provided, the large cranes would have dug themselves in and mired down in the soft bed beneath their treads.

Manitowoc's clean design and extra strength of major components enabled the Brewster company to mount many heavy, bulky special attachments. The cranes carried 11 to 14 tons of compressors, in addition to sand skips and extra rigging and leads.

When leading contractors such as Geo. M. Brewster & Son, Inc. tackle a demanding job like this one, they rely on Manitowoc shovels and cranes to do a better job, with less downtime and maintenance. The same advantages that make Manitowocs first choice for the specialized jobs, can help *you* make more profit on conventional jobs, too. Ask your distributor for literature on the Manitowoc that fits your work schedule best. There's a wide range — from 1¼ yd. to 7 yds., and 25 tons to 125 tons.

MANITOWOC ENGINEERING CORP.
(A subsidiary of The Manitowoc Company, Inc.)
MANITOWOC, WISCONSIN

Brewster-designed sand skips ranging in size from 5 to 12 yards are filled with select sand shipped in by barge and rail to the New Jersey job site.

Loaded sand skips are hoisted up special leads — towering 118 to 174 ft. high — then automatically dump the load into the mouth of the casing where the sand is compacted under 100 P.S.I. pressure.

Manitowoc

The most *USEFUL* line of
Standard and Custom-designed machines

CRANES	TRUCK CRANES	SHOVELS	DRAGLINES	TRENCH HOES
25-125 TONS	45 and 60 TONS	1¼-6 YDS.	1¼-7 YDS.	1¼-3 YDS.

Steel columns have shearheads ready for concrete waffle floors and roof of . . .

New York's newest airline terminal, which puts passengers close to departing planes.

Compact Terminal Can Load Ten Planes

By Theodore F. Mariani

Design of the Northwest-Northeast-Braniff terminal, at the New York International Airport, eliminates the major inconveniences familiar to air travelers.

The architects have created a compact rectangular terminal around which are spaced ten plane positions. The gate holding areas are also around the periphery of the building, adjacent to the planes but within the confines of the main concourse and close to the central ticketing areas.

The plan of this unit terminal is, in essence, a single spacious volume enclosed in glass and aluminum. All services, including ticketing and weighing-in counters, dining and other concessions are housed in two centralized islands that extend from the ground floor up through the roof.

• **Centralization**—Because services are centralized, the surrounding areas are free for circulation and passenger-holding at the ten gate positions that ring the concourse. Four Northwest gates are along the west side, four Northeast are along the east side and two for Braniff are on the south end.

Departing passengers will enter the concourse level from an elevated vehicular ramp at the north end of the terminal, check in at the centralized ticket booths, then without leaving the main concourse proceed directly to their holding areas. Passengers from arriving aircraft will enter the terminal at the concourse level, descend by escalator one flight to claim their baggage, and leave the terminal from the lower level, meeting their ground transportation on the ramp directly below the elevated roadway.

The building itself will be on three principal levels, with the main concourse about 10 ft above the apron level. Five feet below the apron will be the operations level, and the baggage check-out lobby. Over the concourse, in separated island areas, there will be two mezzanines: one for VIP lounges and other public uses, the other for administrative offices. Two penthouses atop the roof will contain the major portion of the mechanical equipment.

Because the concourse of the terminal is to be about at the level of jet aircraft passenger decks, second-level loading ramps will be used to take passengers directly from the concourse into awaiting planes. Latest improvements in these ramps permit them to be mounted integrally with the terminal and to have a three-way articulated movement that offers almost any adjustment or positioning.

• **Structural costs and design**—Now under construction, the building is scheduled to be in full operation by April, 1962. The completed facility will service arriving and departing jets at the rate of 20 an hour. With 240,000 sq ft to be built at a cost of about $10 million, the terminal is one of the most economical constructed to date at New York International (Idlewild). This economy of construction was due in large measure to the integration of the architectural, structural and mechanical design during the basic planning stages of the facility.

For example, the over-all design is based on a 36-ft-square bay, with steel columns on piles and reinforced concrete flat-plate floors. The 36-ft bay spacing was selected to minimize total cost for piles, pile caps and superstructure.

Steel columns and shearheads were shop fabricated and delivered to the site ready for erection. Total erection time for all steel columns was only seven days, thereby allowing the structural concrete slab work to proceed without delay.

Welded steel shearheads are used to transmit shear from the slabs to the steel columns, thus eliminating much of the time consuming work usually associated with normal column capital forming and reinforcing.

In addition to the repetitive nature of the square bay system, use of cantilevers at the edge of every slab insures

(Story continued p. 49)

***Mr. Mariani** is a partner in the firm of White and Mariani, Washington, D. C., architects-engineers, designers of the Northeast-Northwest-Braniff terminal.*

Take a good look at what you can do with the complete family of USS Design Steels

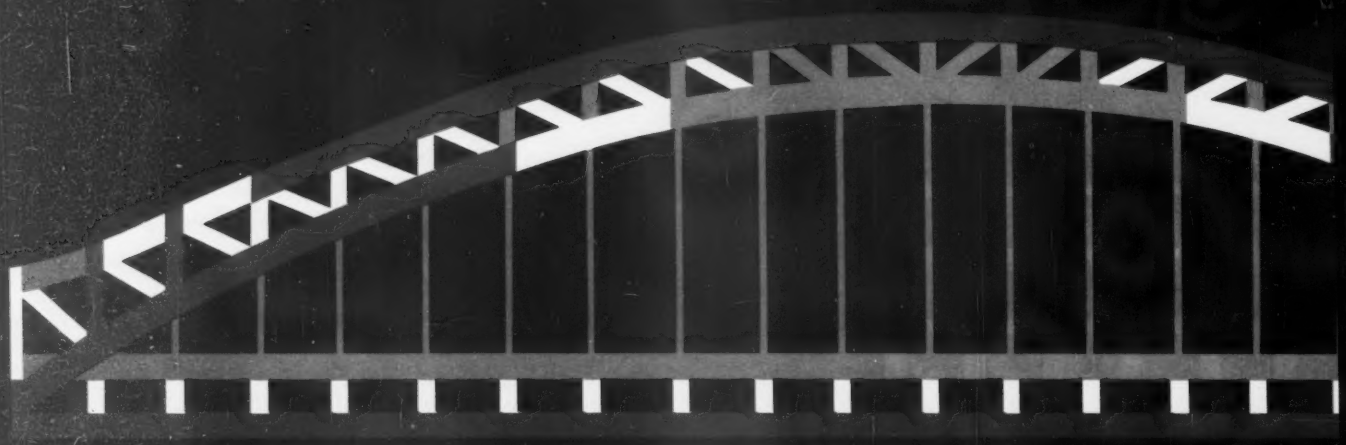
Over the past 50 years, the steel industry has developed at least 10,000 new steels! Many of these steels have been proved thoroughly on the job and wait only for the design magic of the right engineer, the right architect or the right designer to put them to use in stronger, safer and more economical structures.

Designers of buildings and bridges now have a whole "family" of USS Structural Carbon Steels, High Strength Steels and Constructional Alloy Steels available in the necessary shapes with minimum yield points ranging from 32,000 psi to 100,000 psi.

Several bridges and buildings have already been built combining these various steels into one structure to obtain maximum strength, light weight and economy—but all kinds of interesting developments lie ahead. It should be a challenge to designers to get the most out of every steel!

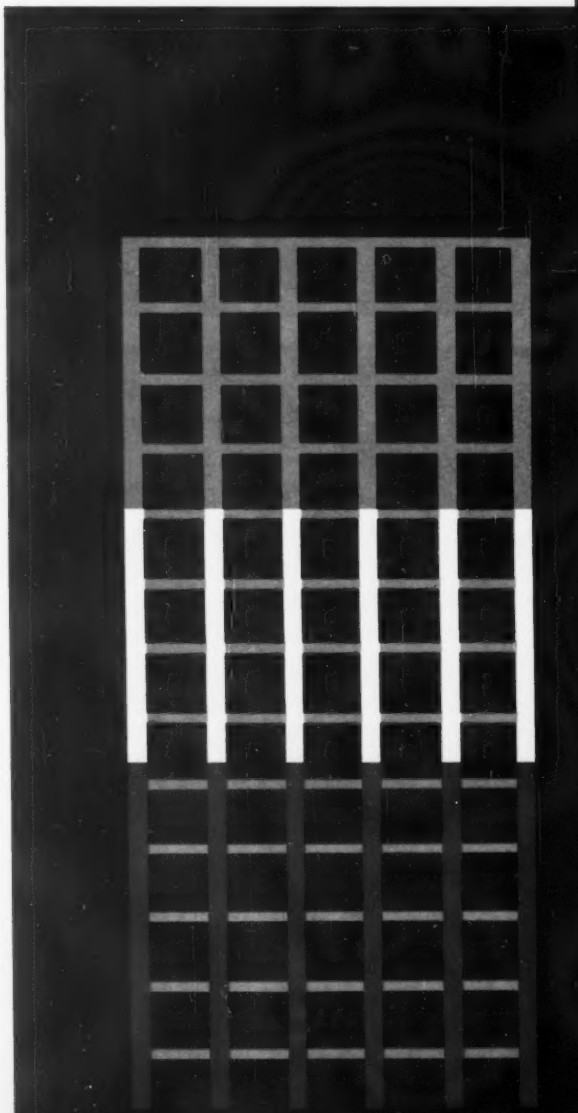
USS **United States Steel**

See the next two pages

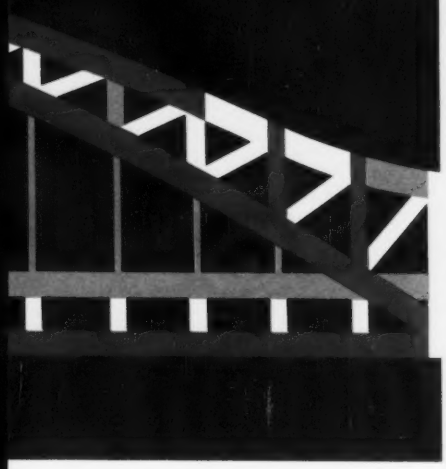


New concept of design for buildings and bridges—get the most out of the family of steels by using them wherever they will improve design, reduce weight or effect over-all savings in construction.

USS Design Steels that do the most to reduce construction costs



This mark tells you a product is made of modern, dependable Steel.



Red—USS "T-1" Constructional Alloy Steel (100,000 psi minimum yield point)

White—USS MAN-TEN High Strength Steel (ASTM A440—50,000 psi minimum yield point)

Gray—USS Structural Carbon Steel (ASTM A36—36,000 psi minimum yield point or A7—33,000 psi minimum yield point)

Pound for pound, these stronger steels shoulder heavier loads . . . or they reduce the size and weight of structural members and foundations. They add valuable floor space to buildings, reduce freight costs and result in faster erection with earlier occupancy . . . all money-saving advantages.

New design concepts are emerging that challenge the designer's imagination and ingenuity. The combining of many steels to get the most out of them has long been practiced by automotive engineers and some other designers. It has given us the best automobiles, the highest television towers in the world, the largest earth-moving equipment and giant radio telescopes.

ASTM A7 Structural Carbon Steel is a mighty versatile and potent metal. No other material so strong (minimum yield point 33,000 psi) and selling at a material cost of less than 10 cents a pound, can be drawn, welded, forged, riveted, punched, and painted so readily and safely. A more weldable carbon steel (A373) has a minimum yield point of 32,000 psi.

ASTM A36 Structural Carbon Steel. The higher yield point of 36,000 psi and the low price indicate that this important new steel may become the predominant structural grade, and that it may displace A373 in welded construction. A36 steel gives the designer the opportunity to provide lighter-weight structures at a low cost. It has been accepted for both building and bridge construction at a basic allowable design stress 2,000 psi higher than A7 steel (20,000 allowable design stress for bridges, 22,000 for buildings). It can be used for riveted, bolted and welded fabrication.

USS High Strength Steels

All have minimum yield points of 50,000 psi. Each has specific area applications where it will do the very best job.

USS MAN-TEN Steel (A440) is a high-strength carbon steel intended for riveted and bolted construction. It is the most economical of the high-strength steels; has good workability, high resistance to abrasion, and atmospheric corrosion resistance double that of plain carbon steel. Since it provides a yield point 50% higher than A7 steel, engineers can design with higher unit working stresses and achieve *real* reductions in steel size, weight and costs.

USS TRI-TEN Steel is a high-strength low-alloy steel intended primarily for use in welded construction. This steel meets all requirements of ASTM A441. It provides greater toughness, even at low temperatures, and has twice the atmospheric corrosion resistance of carbon steel. TRI-TEN Steel has been widely used for bridges, buildings, machinery and railroad equipment to reduce weight and costs or to provide increased strength and load capacity without increased weight.

USS COR-TEN Steel is recommended for all applications in which relatively high resistance to atmospheric corrosion is considered necessary. It permits the use of thinner sections to take advantage of the increased strength of the material, or the use of equal or heavier thickness for extended life *with or without protective coating.* Paint lasts up to twice as long on COR-TEN Steel as it does on carbon steel.

USS "T-1" Constructional Alloy Steel. This is the "superman" of structural steels with a minimum yield strength of 100,000 psi. It is furnished quenched and tempered and is readily weldable. It has four to six times the atmospheric corrosion resistance of structural carbon steel and possesses exceptional toughness over a wide range of temperatures down to −50°F. "T-1" Steel combined with USS TRI-TEN High-Strength Low-Alloy Steel and carbon steel has already been used in a number of bridges. In Carquinez Strait Bridge in California, it saved $800,000 with big savings in weight. This led to its use in Martinez Bridge nearby, Louisville-New Albany, Whisky Creek and others under design. "T-1" Steel is available in standard structural shapes as well as bars, semi-finished and sheets.

USS "T-1" type A Constructional Alloy Steel. This is a lower-priced steel with the same high yield strength of 100,000 psi in thicknesses up to 1 inch. It can be used in highly stressed members to obtain maximum strength, with reduced size, weight and costs. It is available in the same shapes as "T-1" Steel.

For more information on any of these USS Steels, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS, "T-1," MAN-TEN, TRI-TEN, and COR-TEN are registered trademarks.

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United States Steel

USS

Now Available...

USS QUENCHED AND TEMPERED STRUCTURAL SHAPES

in such grades as "T-1", "T-1" type A, 9% Nickel and HY-80 Constructional Alloy and Armor Steels

Announcing another industry "first" for United States Steel—USS Quenched and Tempered Alloy and Armor Steel Structural Shapes are now commercially available for the first time anywhere, in the types and sizes shown in the accompanying tables. The more commonly used sizes of Wide Flange Beams, American Standard Beams, Channels, Equal Angles and Unequal Angles will be produced in these USS Steels: "T-1", "T-1" type A, 9% Nickel, HY-80 and certain other alloy grades that provide desirable mechanical properties after quenching and tempering. Later, other sizes and shapes will be added according to demand.

These quenched and tempered alloy and armor steel structural shapes (see table below) can simplify design and result in substantial weight savings, increased structural strength and reduced shipping and handling costs. For a free folder about any of these steels or their structural shapes, contact your local USS representative or write to United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. USS and "T-1" are registered trademarks.

United States Steel Corporation • Columbia-Geneva Steel Division • Tennessee Coal and Iron Division • United States Steel Supply Division • United States Steel Export Company

Availability Quenched and Tempered standard structural shapes are available in the following shapes and sizes:

I	Beams: 8″ to 16″ inclusive	Selected Wide Flange Sections and Foot Weights*
I	Beams: 6″ to 12″ inclusive	American Standard Sections and Foot Weights*
[	Channels: 6″ to 15″ inclusive	American Standard Sections and Foot Weights*
L	Equal Angles: 3″ to 8″ inclusive	Standard Sections*
L	Unequal Angles: 3½″ x 3″ to 8″ x 6″ inclusive	Standard Sections*

*See our booklet, "USS Shapes & Plates," ADUCO-27001

Maximum length 40′ for all sections

Mechanical Properties of Quenched and Tempered Alloy and Armor Steel Structural Shapes

	Yield Strength, psi	Tensile Strength, psi	Elong. in 2″, % min.	Reduction of Area, % min.	Longitudinal Charpy Impact (when specified)	
					Keyhole	V-notch
"T-1" Steel 2½″ and Under	100,000 min.	115,000/140,000	18	55①	15 ft.-lbs. @ −50F	30 ft.-lbs. @ +10F
"T-1" type A 1″ and Under	100,000 min.	115,000/140,000	18	55①	15 ft.-lbs. @ −50F	—
Grade A 9% Nickel	60,000 min.	90,000 min.	22% min.	—	15 ft.-lbs. @ −320F	20 ft.-lbs. @ −320F
Grade B 9% Nickel	65,000 min.	95,000 min.	20% min.			
HY-80 ⅛″-2″ Incl.	80,000/100,000②	—	19③	—	—	70 ft.-lbs. @ −120F

① ¾″ and under—45% min.
② ½″ and over, yield strength range is 80/95,000 psi
③ ½″ to 2″ inclusive, elongation 20% min.

USS United States Steel

continuity throughout while balancing moments at the exterior columns.

Slab floors are of waffle-slab construction, with domes on a 3-ft module. The slab is 4 in. thick and ribs are 16 in. thick.

The waffle construction serves as the finished ceiling in the main waiting room. For the two mezzanines that surround the center islands, a suspended ceiling is used.

Mezzanine floor slabs cantilever out 12 ft from the supporting columns, and are much thinner than the floors closer to the columns. Because ribs are omitted at the edges and the suspended ceiling held back 3 ft, the mezzanine floors are revealed as a series of dentils. This decreases the apparent thickness of the floor construction and saves on the aluminum fascia.

In addition to the aforementioned economies, a substantial savings was realized in wiring, duct work and piping, without sacrificing quality, because the mechanical systems eminate from the two central cores.

• **Wall and canopy**—The panel wall enclosing the concourse and mezzanine levels is of alternating glass and aluminum panels; the glass is a gray, heat-absorbing, glare-eliminating type, and the panels are a contrasting, porcelainized aluminum. Neoprene rubber gaskets will be used to glaze the panel wall, a rather unique application since it involves such large areas of glass subjected to high wind loadings.

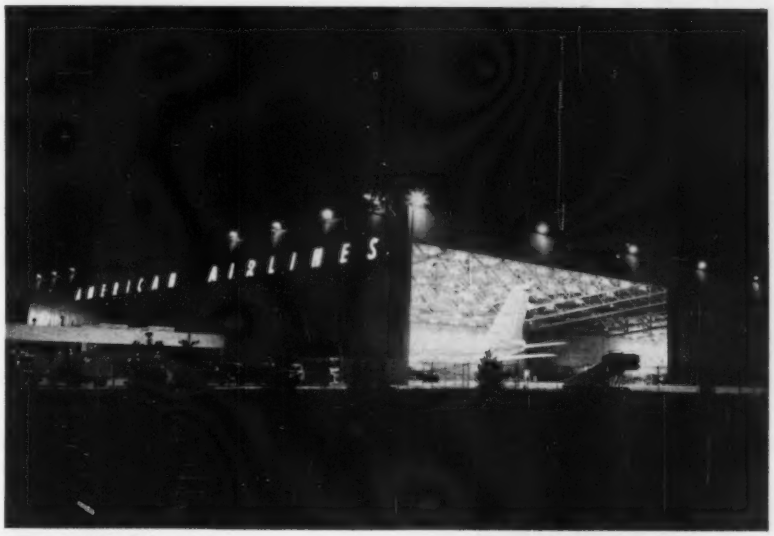
The central concourse and concession area is flanked by two glass walls, 23 ft high and 140 ft long. These glazed walls are recessed 12 ft from the adjacent panel walls of the main superstructure.

The superstructure itself cantilevers 12 ft over the darker glazed masonry unit base that serves to enclose the operations level. This overhead projection affords desirable cover from the weather for all apron operations.

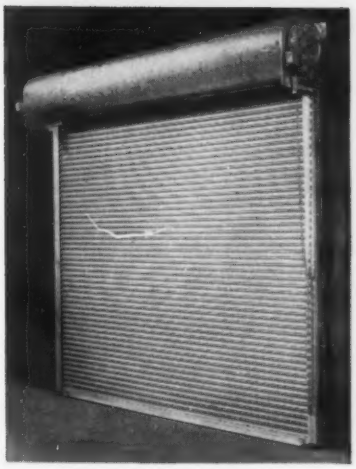
A unique feature of the exterior design is the main entrance. The slightly curving entrance-ramp to the terminal provides six traffic lanes on the upper level. Covering this upper ramp are three rows of octagonal-shaped, umbrella-like concrete canopies, each 36 ft across and each supported by a single concrete column.

The project is being managed by Northwest Airlines, under the general direction of the Port of New York Authority. White and Mariani of Washington, D. C., are the architects-engineers. Carl Kohler of the staff of White and Mariani was in charge of architectural design. The office of E. F. W. Franck of Roslyn, N. Y., were consulting mechanical engineers. George A. Fuller Co., New York City, is the general contractor.

THE CLIENT IS PLEASED



American Airlines Hangar #10
Idlewild Airport, New York City
Arch./Engr.—Kahn & Jacobs
Contr.—Turner Construction Co.



Automatic Rolling Fire Door UN20

Since 1958 American Airline's Hangar #10 has been protected by Balfour Automatic Rolling Steel Fire Doors. These doors combine automatic fire protection with the dependable service essential to quick aircraft maintenance in this jet age hangar.

Balfour rolling doors

doc-port® doors
steel service doors
automatic fire doors
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steel grilles

Catalog in Sweet's or write:
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23

Shield Doors Grow in

By John M. Ruddy

Radiation shielding doors are becoming heavier, more expensive, and more common as atomic installations proliferate.

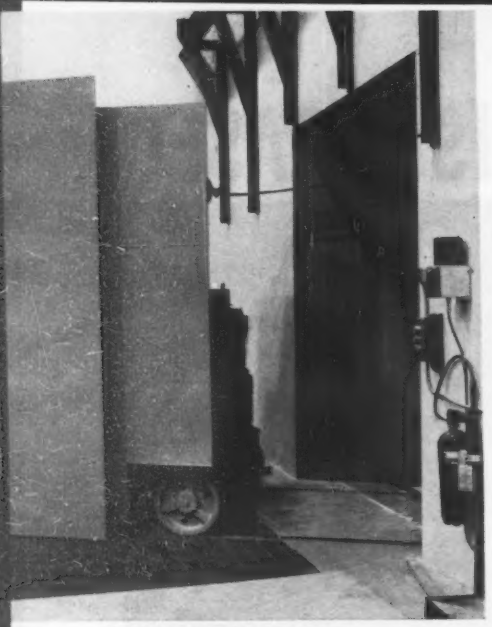
New "hot" cells, similar radioactive isotope handling arrangements, and the radiation chambers of high energy X-ray machines or accelerators require development in shielding doors. This should lead to greater standardization in design and manufacturing data.

Shielding doors must provide full shielding primarily from gamma rays and, to a lesser extent, from neutrons. They must protect not only personnel but instruments even more sensitive to radiation than humans.

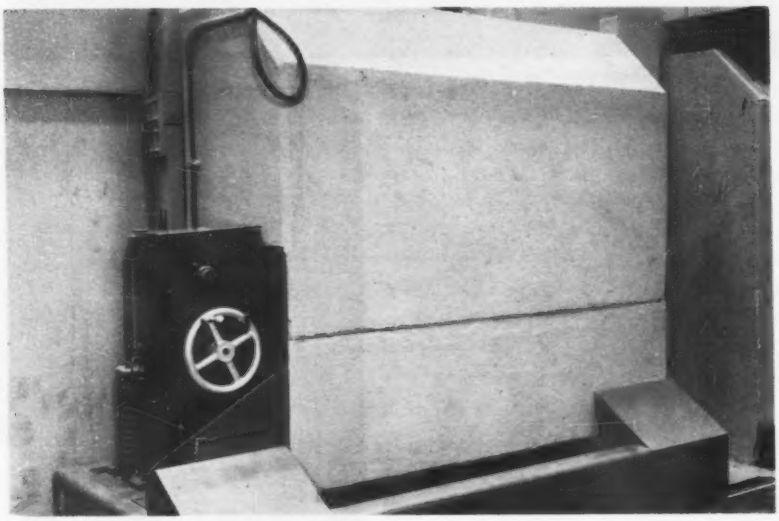
John M. Ruddy is chief engineer of the Architectural Planning Division of the Brookhaven National Laboratory.

• **Costs**—A true cost comparison of metal vs. concrete doors is almost impossible. The installed cost of concrete doors runs about $600 per ton in the 15 to 30-ton range, compared with $1,000 for steel and steel-sheathed lead doors. But less calculable factors—e.g. stationary shielding, additional space occupied, size and awkwardness in handling—weigh against concrete.

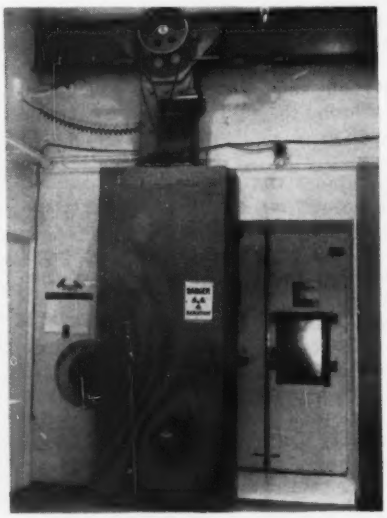
Concrete for shielding doors comes in standard density (145 lbs per cu ft), medium heavy (240 lbs per cu ft), and heavy (300 plus lbs per cu ft). Concrete doors usually have a metal edge frame; some are encased in metal. Metal doors are generally all steel (plates) or steel-sheathed lead.



ROLLING DOOR is low-cost space waster.



OVERLAP DOOR features simple construction but requires extra wall shielding.



ROLLING OVERLAP: for big equipment.

VERTICAL LIFT conserves floor space but requires safety devices.

HINGED door: good operation, high cost.

Size, Cost

• **Door types**—Classified by use, shielding doors fall into three categories:

• Personnel-material type (minimum size suitable for personnel entry: 2 ft 6 in. x 6 ft 8 in.).

• Personnel-material-equipment type (minimum size 4 ft x 7 ft).

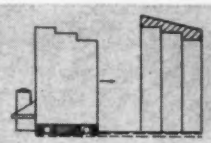
• Material-equipment type (infrequently opened to admit large equipment).

From a design standpoint shielding doors are either plug or overlap. By method of support they comprise four categories: rolling (tracks on floor), hanging (tracks for trolleys), lift (above floor, guillotine, and below-floor) and swinging (hinged).

Heavy "hot" cell doors are generally operated hydraulically or electrically. Manually operated doors not only require excessive physical effort to open and close, they are difficult to coordinate with the safety instrumentation system. Mechanized doors should have a fail-safe feature (i.e., the door must shift at point of failure to manual operation). Maintenance of mechanical and electrical parts should be easy.

Glazed light metal doors at the inside cell surface increase the ventilation efficiency when the heavy shielding door is open (sometimes for days).

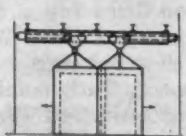
• **Importance of tolerances**—Heavy shielding doors presently occupy a no-man's land between heavy construction work and large machine fabrication. Thus the dimensional tolerances must be set carefully. The designer must establish all size, squareness and alignment tolerances and surface finish specifications. Tolerances must be suitable both for door manufacturers and for installers.



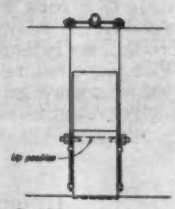
1. Rolling plug door—
General description: Flush with wall when closed, supported on two floor-mounted tracks, usually on four unsprung wheels.
Drive: Gear-reduced electric chain drive best; emergency manual drive with sprocket and chain or ratchet wrench can be added. Pneumatic or hydraulic cylinder drive impractical because of unusually long stroke.
Material: Generally same as wall.
Advantages: Simplicity of design, easy installation, minor additional shielding requirements, relatively low cost. (It can also be used as a carrier if a special bracket is attached to the inside of the door.)
Disadvantages: Difficulty of shielding bottom edge, use of valuable floor space.

2. Hanging plug door—
General description: Hung on two parallel rails and suspended by four or more trolleys.
Drive: Direct electric drive or wall-mounted motor reducer with sprocket and chain.
Material: Generally same as wall.
Advantages: Full shielding relatively easy on all four sides, no tracks on floor.
Disadvantages: Difficulty of fitting, use of valuable space next to the cell, encroachment of door rails on headroom for doors 8-ft high and less. (Designer must decide which of following alternatives is least objectionable: a heavy lintel over the door, or a heavier door resulting from increased height.)

3. Rolling overlap door—
General description: For large equipment entry. Infrequently opened, can be made part of the wall itself.
Drive: Direct electrical sprocket and chain, hydraulic or pneumatic.
Material: Generally same as wall.
Advantages: Simplicity, relatively low cost.
Disadvantages: Use of both floor and wall space, large overlap for shielding, additional shielding requirements in wall.



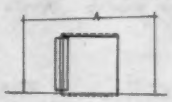
4. Overlap or recess door—
General description: Surface mounted on cold side of cell; recessed doors require auxiliary shielding.
Drive: Direct electric, wall-mounted sprocket and chain, hydraulic or pneumatic.
Material: Steel, lead, cast iron, sometimes heavy concrete.
Structural factors: Wall haunches, anchor bolt support for door rail.
Advantages: Little required floor area, simplicity of design and construction, full shielding on all four sides.
Disadvantages: Need to keep a large section of wall clear of plugs or protrusions; considerable overlap of shielding; supplementary wall shielding required in vicinity of door.



5. Vertical lift doors—
General description: Surface mounted.
Material: Steel plate, steel covered lead, heavy concrete.
Drive: Overhead crane or special winch.
Advantages: Uses no floor space or operating wall space.
Disadvantages: Danger of falling requires safety devices when open, overlapping and additional shielding.

6. Lift—Balanced guillotine—
General description: Either surface mounted or recessed.
Drive: Low powered electric motor.
Material: Steel plate or steel-covered lead.
Advantages: Simple balanced mechanism, low power requirements and easy maintenance.
Disadvantages: Pit required for door to descend into, (it could become a collection place for contaminated material).

7. Lift—Vertical drop—
General description: Surface mounted, recessed or used as partition between two hot cells.
Drive: Hydraulically powered.
Material: Steel plates.
Advantages: Versatile use.
Disadvantages: Expense, difficult maintenance.



8. Hinged door—
General description: Plug or overlap, single or double. Normally located on cold side of hot cell mounted flush with wall.
Drive: Manual.
Material: Steel plate.
Advantages: Ease of operation.
Disadvantages: Expensive, precise frame (hinged like bank vault door).

Union Wire Rope

When the going gets tough-- Tuffy gets going,

Victim of the Bends

Excessive bending of wire rope accelerates wear. Generally, more flexible ropes are used as bending stresses increase (with decrease in tread diameter of sheave or drum). If a rope is operated on a sheave too small for its bending characteristics, early failure is certain. Through an exhaustive series of bending tests, Union Wire Rope engineers have compiled data that you can use to assure getting the rope construction that will give you the longest service life. Ask about it.

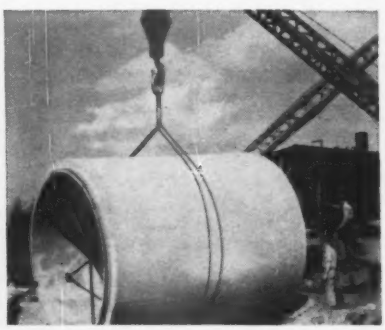
Kick Out Worn Sheaves

Old sheaves may never die, but in "fading away" they develop conditions which shorten rope life. Sheaves with grooves corrugated with rope lay impressions should be replaced with new ones before new wire rope is installed.

Union Tuffy's on these jobs give you the ultimate low cost.

Tuffy Scraper Rope

Flexible enough to take sharp bends; stiff enough to resist looping and kinking when slack; highly resistant to the shock of load impact — that's Tuffy balanced construction. Mount a reel on your scraper—save wasting sound rope.



Tuffy Slings and Hoist Lines

Slings are a patented, 9-part machine-braided wire fabric that is next to impossible to knot or kink. Hoist lines have built-in strength, toughness, flexibility. Balanced—a top-performing team for handling every type of material. In addition to Tuffy, Union Wire Rope furnishes a complete line of slings.

Tuffy Dozer Rope

Mounts right on your dozer in a 150′ reel. When rope shows wear, just feed through enough to replace the damaged part. Saves rope, gives you a bonus of extra service. Also available in 300′ and 500′ reels.

The Union Wire Rope Organization Gives You . . . RIGHT-NOW service with the RIGHT rope. Get set for quick action. Vast Union Wire Rope facilities assure fast delivery of just the wire rope or sling you need. More than 1600 standard constructions are available *plus* the famous Tuffy family of ropes and slings tailored to special needs. Hundreds of distributors and 15 strategically located warehouses help you meet emergencies—cut wasteful down-time. Call your Union distributor. He's listed in the phone book Yellow Pages.

Tuffy® Tips

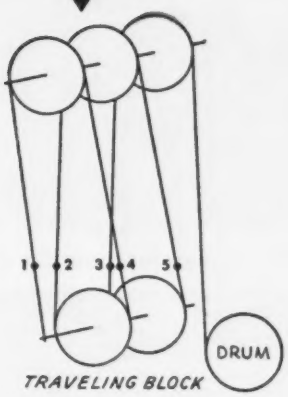
and keeps going longer if not abused

Diameter of Rope	Min. Dia.	Max. Dia.
¼ - 5/16	+ 1/64"	+ 1/32"
3/8 - ¾	+ 1/32"	+ 1/16"
7/8 - 1⅛	+ 3/16"	+ 3/32"
1¼ - 1½	+ 1/16"	+ 1/8"
1⅝ - 2¼	+ 3/32"	+ 3/16"
2⅜ and larger	+ 1/8"	+ ¼"

Recommended groove sizes:

New ropes are usually over-size. It is advisable to have groove diameters of sheaves or drums as large as the actual calipered diameter of the new rope, or slightly larger. We recommend sizes as (above) charted.

New steels are born at Armco

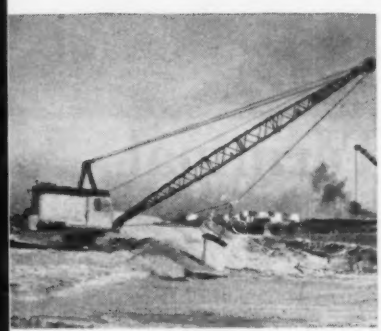


How to Figure Reeving Loads

Reeving ropes through the sheaves multiplies the number of parts supporting the load. The lead line to the drum carries the weight of the load lifted, divided by the number of parts, plus the accumulation of friction on all sheaves.

To count the number of parts supporting the load, draw an imaginary line across the parts of the rope supporting the load.

The efficiency of reeving systems ranging from one to eight parts is shown in charts which Union Wire Rope engineers make available to users.

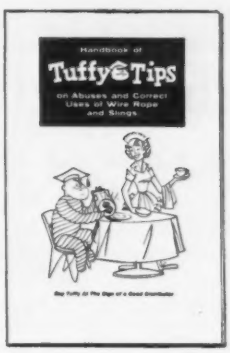


Tuffy Dragline Rope

High abrasive resistance and super flexibility. Gives long service, dependable action in handling any material—wet or dry dirt, sand, gravel, rock, minerals. Rides smoothly on grooves—hugs the drum when casting for full load.

Union's Handbook of TUFFY TIPS—Free!

The "Tuffy Tips" shown here are quoted right out of Union Wire Rope's handbook. In it there are dozens of other priceless hints on the correct use of wire rope. The common abuses and how to avoid them. How to save costly injuries. Maintenance tips. The proper fittings and how to apply them. Recommended sizes. Many other facts and suggestions that will cut down your rope costs and help you get out of wire rope the full service we build into it. No charge. Write Union Wire Rope, Armco Steel Corporation, 2228 Manchester Avenue, Kansas City 26, Missouri.



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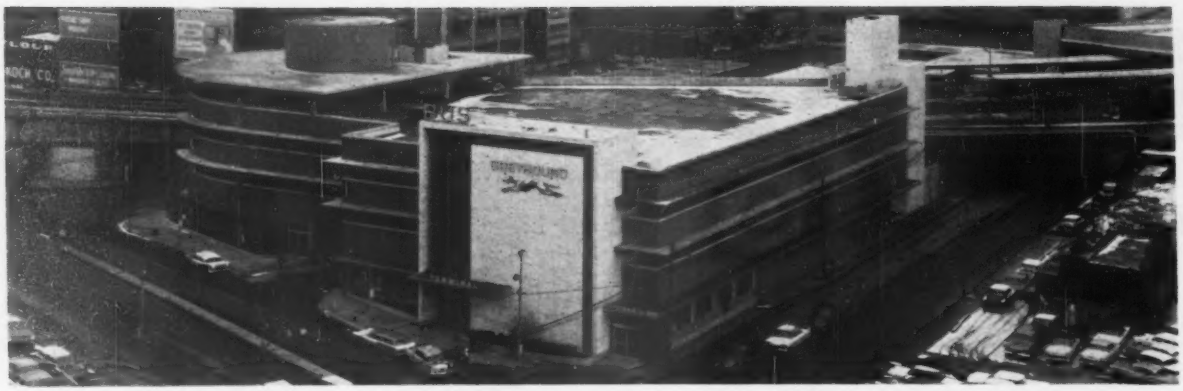
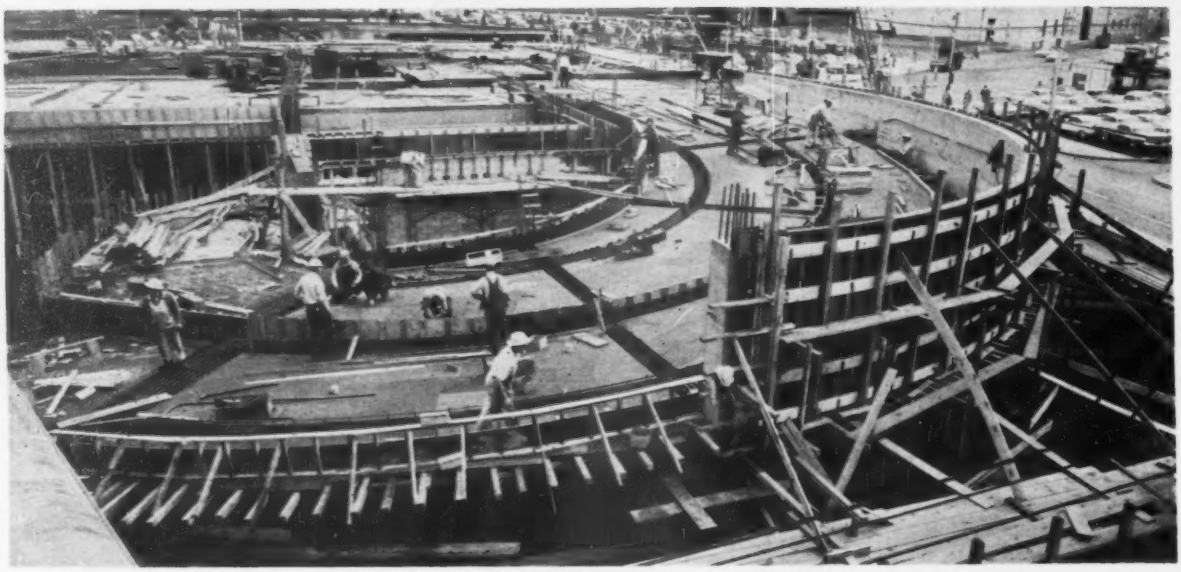
ARMCO Union Wire Rope



Greyhound Bus Terminal fits under and around an existing plate-girder railroad bridge.



Curved forms were built for helical beams that support a double-lane entrance ramp.

Lightweight Concrete Frames Terminal

By E. W. Baldwin and John W. Hummel

Building a bus terminal under and around an existing railroad plate-girder bridge posed several structural problems. The designers found an economical answer in lightweight concrete construction.

The need for large column-free areas to accommodate bus operations at Pittsburgh's Greyhound Bus Terminal and Parking Garage dictated use of lightweight aggregate for the concrete superstructure. And the requirement for fireproof construction led the engineers to choose expanded blast-furnace slag, with ½-in. maximum size as the aggregate.

The $3.5-million structure provides 21 bus loading stations at grade level, topped by a three-level parking structure with space for 135 cars. Interference from the railroad bridge resulted in irregular bays and long spans—up to 75 ft for spandrels, 63 ft for interior girders.

The great savings in dead load made lightweight aggregate not only an economy, but almost a necessity. Additional height over the 11½-ft floor-to-floor distance would have made ramp grades excessive. The lightweight 3,000-psi mix produced a specified maximum "green" weight of 110 lb per cu ft.

Framing for the terminal's first floor is a slab-band system with maximum spans of 23 ft. Slab depth varies from 6 to 8 in.; band depth is 10 in. and maximum width 66 in.

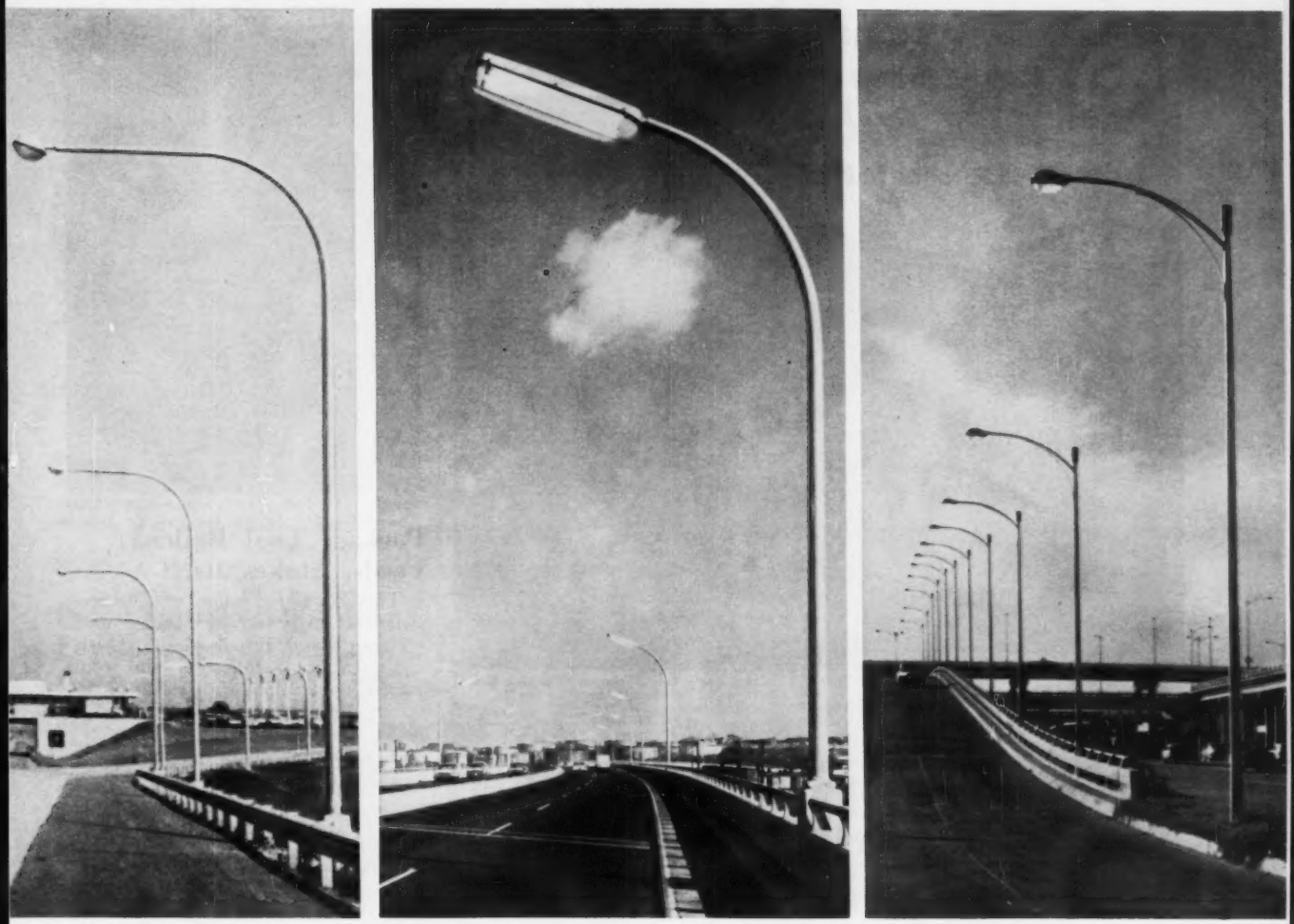
Concrete joists carried by continuous concrete girders, 24 x 48 in., frame the parking garage. Spandrels, 86 in. deep, span bays of 75 and 61 ft parallel to the railroad bridge. Long-span girders and beams received a 2-in. camber. Compression reinforcing controls the deflection resulting from the relatively high rate of plastic flow in the lightweight concrete.

A double-lane circular ramp (see photo) provides access to the garage. Helically curved beams, with rectangular ties resisting the torsional shear, support the 6-in.-thick ramp slab. The exit lane loops under the entrance ramp at the second floor to eliminate crossing traffic at the entrance on one street.

Architects-engineers were Arrasmith & Tyler of Louisville, Ky., with Hoffman & Crumpton of Pittsburgh as associate architects. Navarro Corp. of Pittsburgh was general contractor.

Messrs. Baldwin and Hummel, **employees of Arrasmith & Tyler, architects-engineers, Louisville, Ky., did the structural design for Pittsburgh's Greyhound Bus Terminal.**

This mark tells you a product is made of modern, dependable Steel.



Count the number of lighting standards here, multiply by $50 . . . and that's how much was saved by specifying steel

We counted 53 standards, so we figured the saving at $2,650 . . . $50 saved on each standard. As an added bonus, steel standards are stronger than those made of any other commercial material. And if you want all the strength of steel, *plus* greater corrosion resistance, with longer paint life, specify standards of USS COR-TEN High Strength Steel...they'll still save you about $45 per standard. COR-TEN Steel is 50% stronger than structural carbon steel and has four to six times the atmospheric corrosion resistance.

Get the advantages of low initial cost and long life of steel. Specify **steel** for standards, guard rails and signs . . . and save money by the mile. USS and COR-TEN are registered trademarks.

USS **United States Steel**

Piers formed with economical
SONOCO
Sonotube®
FIBRE FORMS

Ideal Cement Company conveyor system, Ada, Okla. Engineered, fabricated and erected by Link-Belt Co., Chicago. Photo by Link-Belt Co.

Round concrete piers help support world's longest belt conveyor system

Ideal Cement Company's permanent belt conveyor, the world's longest, extends for 5½ miles across country and will deliver 1,000 tons of crushed limestone or shale per hour from quarry to cement plant.

Sections of this unique structure are supported by round concrete piers, ranging to 30 feet in height, which were formed with SONOTUBE Fibre Forms. This conveyor is one more example of how low-cost SONOTUBE Fibre Forms, with their great versatility, can save time, labor and money in any type of structure where round concrete piers or columns are required.

Because they are lightweight and easily handled, Sonoco SONOTUBE Fibre Forms place, brace, pour and strip quicker . . . thus providing a faster, more economical forming method for round columns of concrete.

Choose from several types according to your requirements. SONOTUBE Fibre Forms are available 2" to 48" I.D., in specified lengths or standard 18' lengths. Can be sawed.

See our catalog in Sweet's.
For complete information and prices, write

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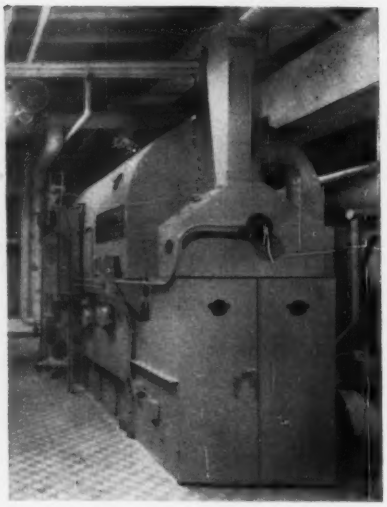
New Products



Package Coal Boiler Feeds, Stokes Itself

The Powr-Matic line of coal-fired boilers is made up of package units with automatic controls.

Designed for industrial and commercial applications with steam or hot water, the package units include a boiler, stoker, coal and ash conveyors, and combustion control system.

Electronic instrumentation actuates firing, stoking and removal of ashes. And turbulent jet firing inside the furnace is said to insure smokeless and thorough combustion of fuel.

Powr-Matic units are available in six sizes that can be operated at 10% to 100% of capacity. When combined with a converter, the packaged boilers will also air condition a building. CANTON STOKER CORP., 300 ANDREW PLACE S.W., CANTON 1, OHIO.

Aluminum Penthouses Dress Up Roof Vents

With horizontal louver blades on all four sides, the C-S Penthouse Ventilator offers trim appearance at low cost. The lightweight ventilator is fabricated from standard aluminum extrusions.

Available with fixed or operating louvers, and in a variety of sizes and shapes, the penthouses have blades that are mitered and welded at the corners. All fastenings are stainless steel.

Minimum snow loads for penthouse roofs start at 30 psf. All roofs are removable.

Skylight domes, emergency smoke vents and other specialized features are also available. CONSTRUCTION SPECIALTIES, INC., 55 WINANS AVE., CRANFORD, N.J.

Honeycomb Core Reduces Weight of Elevator Cab

A four-ply sandwich panel, with a honeycomb core, is said to reduce elevator cab weight by 30% when used for the walls, doors and roof.

The panel's core is a composite of ¾-in. dia hexagonal cells, made of 99-lb Kraft paper. Plywood, ⅛ in. thick, is bonded to both sides of the core, and 27-gage aluminum is bonded to the outside.

Interior finishes vary according to specifications.

The honeycomb core weighs 1.6 lb per cu ft and has a compressive strength of 57 psi.

The lowering of dead weight offers cost savings by allowing a reduction in counterweight, machinery and structural support. The honeycomb core is also said to offer noise and vibration attenuation. TRIUMPH METAL PRODUCTS, INC., 4144 PARK AVE., NEW YORK 57, N. Y.

Power Shift, Less Weight For Redesigned Tournapull

A redesigned B Tournapull weighs 5,000 lb less than its predecessor and includes an optional power shift transmission.

The machine, which has a 37 ton capacity, carries 25 cu yd struck and 32 cu yd heaped. It is lightened mainly by the use of high strength steel in the yoke, apron and structural members of the scraper.

The transmission, designated as "Powerflow 700" is a constant mesh, countershaft type unit with full power shift and a torque converter. The B Tournapull also still is available with a step-gear type transmission. LETOURNEAU-WESTINGHOUSE CO., 2301 NE ADAMS ST., PEORIA, ILL.

Packaged Liquid Chiller Follows Compact Trend

The Packaged Tonrac line of centrifugal refrigeration machines ranges from 50 to 100-ton capacities. Designed to provide chilled water in the operation of zone or individually controlled air conditioners, all eight models fit through a standard 36-in. doorway. And the largest model requires only 31 sq ft of floor space.

Factory assembly includes insulation and regulatory components and insulation. Thus, installation requires only electrical and main water-pipe connections. AMERICAN RADIATOR & STANDARD SANITARY CORP., INDUSTRIAL DIVISION, DETROIT 32, MICH.

Save time, labor, money with

SONOCO

Sonotube®

FIBRE FORMS

Addition to Goldwaters, Park Central Shopping Center, Phoenix, Arizona
General Contractor: Kitchell-Phillips Contractors, Inc.—Precast Structural Units: Super Sand & Gravel Co.—Architect: John Schotanus—Structural Engineer: Frank Foltz & Assoc.

Simplify precasting of reinforced round concrete columns

While round concrete columns are normally cast-in-place, job conditions occasionally necessitate *precast* supports. SONOTUBE Fibre Forms, well-known for their many advantages in on-the-job forming, also provide a time-saving, money-saving method of precasting reinforced round concrete columns.

These low-cost, lightweight forms are easy to handle, place, pour and strip. And, with SONOTUBE Fibre Forms, you can cast any number of columns at the same time.

An additional advantage is protection of the columns in transit. After the forms have been poured and the concrete sets, strip the SONOTUBE Fibre Forms within the recommended time, then wire the stripped form halves back on the columns.

In bridges, buildings or any structure requiring round columns of concrete (or half-round, quarter-round, obround columns and pilasters), use SONOTUBE Fibre Forms—they are faster and more economical than any other method! Order standard 18′ lengths or required lengths . . . in sizes 6″ to 48″ I.D. Can be sawed.

See our catalog in Sweet's.

For complete information and prices, write

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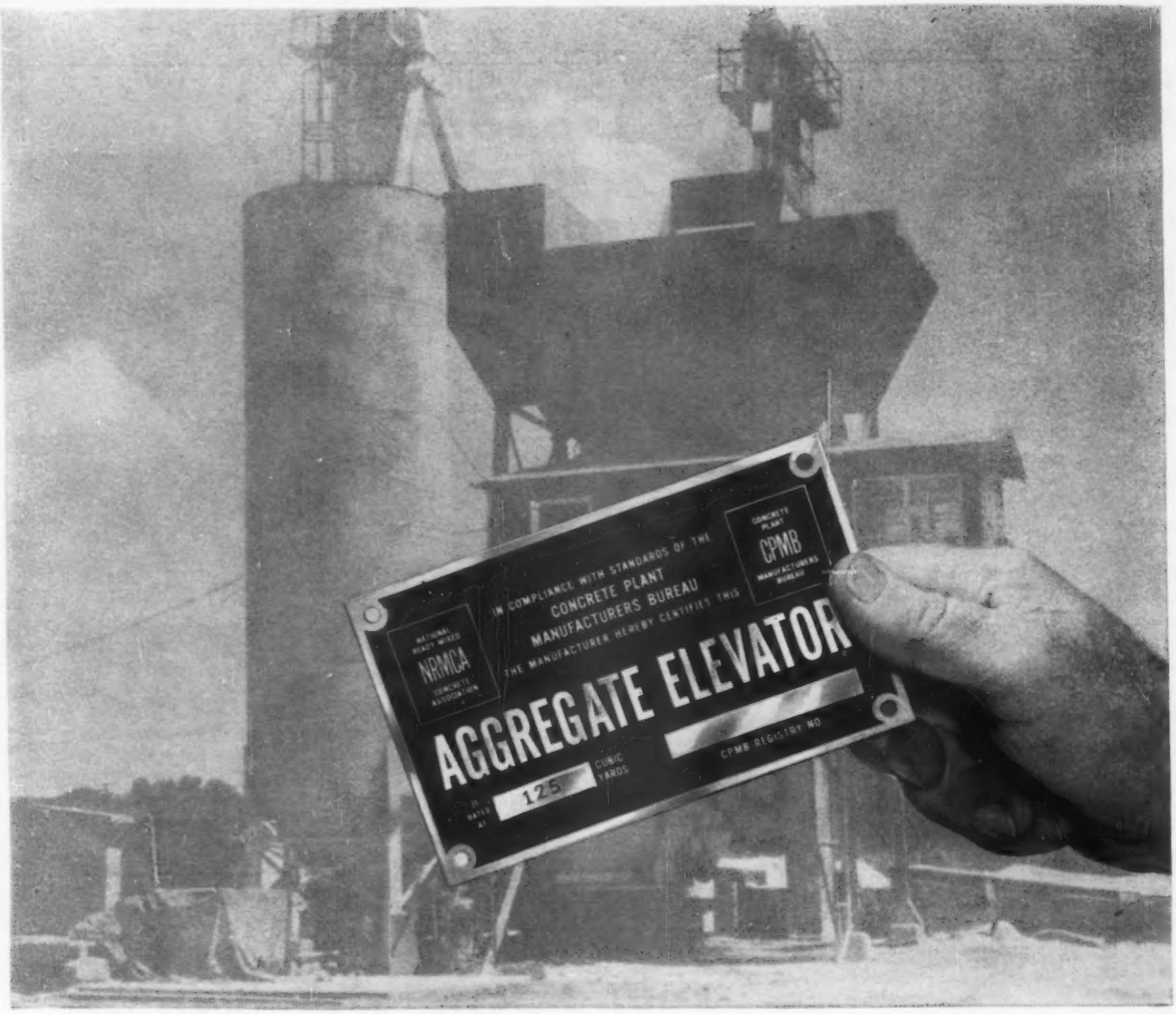


Your concrete plant is for a "lifetime"... and so are your relations with its builder

Most of the construction equipment you buy will be worn out and replaced in 10 years — or sooner. *But not your concrete plant.*

Many plants 25 to 30 years old, and even older, have readily been up-dated and are still in use. These are plants built by members of the Concrete Plant Manufacturers Bureau (CPMB). It is the universal practice of CPMB members to maintain stocks of parts and the complete "paper" for all plants they manufacture, against customers' future needs for replacement of either component equipment or structural parts.*

This valuable "lifetime partnership" starts even before your plant is built. Your manufacturer's study of your plant site and what your new plant is intended to do can easily save 10%, even 20%, in construction costs, or effect a comparable increase in your plant's productivity. Proper prefabrication and assembly not only save much costlier field work but make future changes and replacements simple.

Benefits are Many

Naturally, any plant built to CPMB standards and bearing the industry's Rating Plate also has a higher resale value. The capacity and performance of its components are certified and guaranteed. It is both functionally efficient and structurally safe.

Copies of "Concrete Plant Standards" are available to all ready mixed concrete producers, contractors and engineers interested in quality standards. Address requests to the Concrete Plant Manufacturers Bureau, 1411 K Street, N. W., Washington 5, D. C.

**CPMB members listed below have on file complete drawings for all plants built by them in the past 18 to 30 years, or since they began manufacturing.*

CONCRETE PLANT MANUFACTURERS BUREAU (CPMB)

An Affiliate of the National Ready Mixed Concrete Association

BLAW-KNOX COMPANY
Pittsburgh, Pa.

BUTLER BIN COMPANY
Waukesha, Wis.

CHAIN BELT COMPANY
Milwaukee, Wis.

ERIE STRAYER COMPANY
Erie, Pa.

THE HELTZEL STEEL FORM AND IRON COMPANY
Warren, Ohio

THE C. S. JOHNSON COMPANY
Champaign, Ill.

NOBLE COMPANY
Oakland, Calif.

Obituaries

G. P. Jessup Dies After Long Construction Career

George P. Jessup, 77, construction superintendent and project manager on large jobs from coast to coast over a period of half a century died in Ithaca, N. Y.

With Stone and Webster Engineering Corp. from 1916 to 1932, he superintended work on industrial plants, steam power plants and hydro facilities for public utility companies. Included among the latter were Baker River Dam in Washington, Conowingo Dam in Maryland and Bagnell Dam in Missouri.

From 1935 to 1946, Mr. Jessup was with the Tennessee Valley Authority, first as construction superintendent on Wheeler and Guntersville Dams, and then as project manager on Kentucky Dam, TVA's largest. In 1947 he was project manager for the Army Engineers on Kanapolis Dam in Kansas and later was construction coordinator on Marble Falls and Granite Shoals Dams for the Lower Colorado River Authority in Texas.

Mr. Jessup graduated in mechanical engineering from Cornell University in 1908, and immediately went into construction work as a foreman on various jobs until joining Stone and Webster in 1916. From 1952 until his death he was back at Cornell serving as project manager on the university's extensive building program.

Harry E. Lindskog, 67, retired long-time general superintendent of Foley Brothers, Inc., Pleasantville, N. Y. Mr. Lindskog built bridges, tunnels and railroad lines throughout the United States and Canada, as well as iron and copper ore processing plants and harbor works in South America.

Harry C. Dinmore, 86, retired construction engineer and founder of the Dinmore Construction Co. of Albany, N. Y.

Eugene L. Fallon, 53, head of Associated Consultants of Washington, D. C. His long career as a private consultant was broken by periods of service with the Coast and Geodetic Survey, the Army Corps of Engineers and the World Bank. He was a graduate of the University of North Carolina.

Samuel L. Damon, 78, a retired major in the Corps of Engineers who was one-time Portland, Ore., district engineer. A graduate of Oregon State College, he had been an ROTC instructor at the University of Illinois and Washington State College.

COMPACT, POWER-PACKED ACKER TEREDO CORE DRILLS

SPEEDS SOIL SAMPLING

IN A VARIETY OF WAYS:

- Drive Sampling
- Undisturbed Sampling
- Penetration Testing
- Permeability Testing
- Wash Boring
- Driving Casing
- Rock Coring and many more!

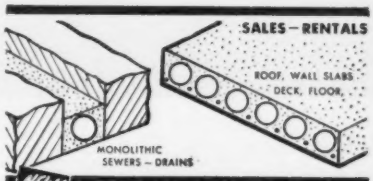
Whatever the sampling technique, the Acker Teredo is up to it! Its modern design and host of useful features makes the Teredo the most useful you can buy!

It's ruggedly built, yet compact and light enough to be completely portable. Mount it on skid base, truck or trailer and power it with gasoline, diesel, electric or air motor. It's easy to use — inexpensive to operate!

Write today for Bulletin 30-ENR.

ACKER DRILL CO., Inc.
P.O. Box 830
Scranton 2, Pa.

Over 40 years of experience manufacturing a complete line of diamond and shot core drills, accessories and equipment.



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REUSABLE RUBBER VOID FORMS FOR SEWERS, SLABS, DRAINS & DUCTS. SUPERSEDES ALL VOID FORMING TECHNIQUES.

- ALL DIAMETERS ¾" TO 120"
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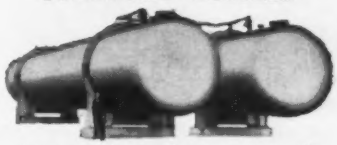

Large capacity vessels and tanks of mild, stainless, or alloy clad steel for petrochemical, butane, petroleum, and pulp industries.

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Custom Fabrication For Over 50 Years

DIVISIONS:
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• Large OD Steel pipe

561 S. PRINCE STREET LANCASTER, PA.

OLD FIRE HYDRANTS

STILL DOING 24-HOUR DUTY

IN CAMDEN, N.J.

The Camden, N.J., Water Department was formed in 1845, when James K. Polk was president. A small building was erected at the foot of Cooper Street to house the pumping station. Water mains were installed and approximately 15 years later, R. D. Wood Hydrants were tied in. Since those days Camden has grown from a community of 6500 people to a modern industrial city of 125,000. All utilities have been changed beyond recognition . . . except for a number of the original R. D. Wood Hydrants that are still in service. Conditions have changed, but the reliability built into those hydrants makes them just as effective now as they were over 100 years ago.

Like all R. D. Wood Hydrants, the oldtimers are of simple but sound construction; their operation cannot be impaired by foul weather, snow, sleet, ice or silt. Apart from the hazard of being in the path of a truck out of control or the possibility of street relocations, there is no foreseeable trouble ahead for them for many more years. There has never been better fire protection for any community than R. D. Wood Hydrants.

Conform to A.W.W.A. specifications

R. D. WOOD COMPANY

FLORENCE
NEW JERSEY
Established in 1803

Manufacturers of "Sand-Spun" Pipe (centrifugally cast in sand molds)

Close bidding highlights award for . . .

Vermont Highway Contract

Crushed rock sub-base, bituminous concrete pavement, and asphalt cement are the big cost items in an $831,590 award by the Vermont State Highway Department. The job is for crushed rock sub-base and bituminous concrete pavement surface course on a one and a half mile dual-road section of Interstate 89 in the town of South Burlington and city of Winooski. Franklin G. Scribner of the highway department field office in South Burlington, is the engineer on this job.

Five companies submitted bids for the job. Prices for crushed rock sub-base (modified), accounting for 48% of cost, run from $2.82 to $3.25 a yard for 127,100 cu yd. Asphalt cement ranges from $0.13 to $0.19 a unit, and 17,560 tons of bituminous concrete pavement run from a low $6.00 to a high $7.25 a unit.

Only $1,142 separated The Lane Construction Corp., Meriden, Conn., from second low, F. W. Whitcomb Construction Corp., Bellows Falls, Vt. The low is just 9% under the high, but 22% below estimate.

Concrete for the job is defined as class B modulus of rupture, 500 psi.

Rental rates for power equipment range from $6 to $15 an hr for 130 hrs of bulldozer rental, and from $8 to $15 an hr for 90 hrs of power grader rental.

Pipe prices range from $9 to $22 a lf for 24 ft of 18 in. special asphalt coated, corrugated, galvanized metal pipe elbow, from $4 to $6 for 220 lf of asphalt coated, corrugated, galvanized metal pipe, and from $1 to $1.70 for 200 lf of relaying pipe culverts. Sleeves for water pipes run from $1 to $3 a ft for 300 lf.

Prices for seeding range from $0.90 to $2 for 1,175 lb of slope and from $1.20 to $3 for 150 lb of lawn seeding. Sodding, 1,050 sq yd, runs from $1 to $2 a yard. About 14,600 lb of commercial fertilizer will be used for the grasses. Bid prices ran from $0.05 to $0.15 a lb, while prices for 4,360 cu yd of topsoil ranged from $1.50 to $4 a yard.

Mulch (modified) must also be supplied by the contractor. The job requires 45 ton at $50 a unit. Prices range from a low of $50 to a high of $70 a ton.

Both rail and highway transportation are available to the contractor, and the job site is located just 1 mile from the railhead.

Wage rates applying to this job include: skilled labor, $4.00/hr; semi-skilled, $2.60 to $3.12; and common labor, $2.08/hr.

The bidding included:

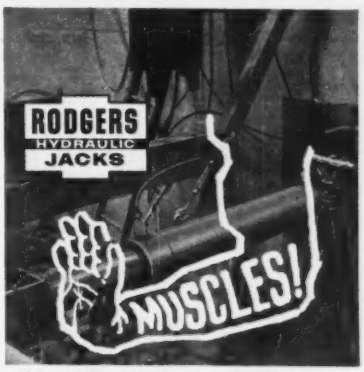
1C The Lane Const. Corp., Meriden, Conn	$831,590
2 F. W. Whitcomb Const. Corp., Bellows Falls, Vt	832,732
5 Cartier Const. Ltd., Montreal, Que	914,560
EE Vermont Highway Department	1,065,410

Bids: 9-29-61 Items	Unit	Quantity	Unit Prices 1C	2
Excavation, common	cy	5,500	$0.50	$0.30
earth, trench	cy	790	2.00	1.50
Borrow	cy	9,800	0.50	0.50
granular	cy	12,100	0.75	0.50
Subgrade, fine grading	sy	208,900	0.07	0.08
Rdwy patrol maintenance	day	45	60.00	15.00
Dust control	Mgal	830	3.00	2.00
w/cal chlor	t	52	60.00	65.00
Bulldozer, rental	hr	130	10.00	10.00
Power grader, rental	hr	90	8.00	10.00
Sub-base, crushed rock, mod	cy	127,100	3.12	2.82
Base course, penetr macadam crushed stone	cy	13,850	4.30	5.00
Backfill, gravel	cy	100	2.50	5.00
Shoulders, crushed stone	cy	4,595	4.90	5.00
Bit mat, double tack coat w/pea stone & stone grits seal; refined tar, prime coat; cutback asph, double seal coat, mod	gal	37,900	0.40	0.40
Tar emul for bri floors	gal	4,777	1.40	1.50
Asph cement	gal	333,000	0.14	0.14
Pavement, bit conc, mod	t	17,560	7.00	7.25
Rolling, proof	hr	50	12.00	15.00
Jt seal, hot-poured, elastic tp	lf	2,210	2.00	2.00
Conc, class B, mod	cy	10	50.00	100.00
Steel, reinf	lb	500	0.15	0.20
Cement, rubble masonry	cy	24	35.00	40.00
CMP e bow, spec asph coated, galv, 18"	lf	24	15.00	20.00
asph coated, galv, 18"	lf	220	5.00	6.00
Culv, relaying pipe	lf	200	1.50	1.00
Sleeves, water pipes	lf	300	1.00	3.00
Riprap, bank protect, mod for culv ends	cy	20	20.00	20.00
CIP underdrain flush basin w CI cover	ea	23	50.00	70.00
Inlet grates, steel drop	ea	9	50.00	60.00
Guard rail, plank w preserv treatment	lf	230	2.75	2.50
3-cable w steel posts	lf	11,872	1.50	1.68
Anchors, for 3-cable guard rail w steel posts	ea	98	40.00	46.00
Guard rail, std steel beam w/steel posts	lf	1,589	2.50	2.45
Guide posts, stee	ea	75	9.00	10.50
Marker posts, steel	ea	130	6.50	6.00
Gutter, bit grout stone	sy	2,600	2.50	2.00
Curb, bit conc	t	260	17.00	20.00
Edging, granite slope	lf	6,789	1.50	1.50
Curb, remove & reset	lf	100	1.00	4.00
treated timber	lf	4,330	0.50	0.60
Markers, proj, erect	ea	3	20.00	15.00
Signs, traffic, reflectorized, high density tp overlaid plywood	sf	450	6.00	9.42
extruded alum panel	sf	3,220	6.00	7.40
flat sheet alum	sf	290	9.00	9.62
overhead				
support, a	ea	1	4,000	5,500
b	ea	1	4,000	5,500
c	ea	1	4,000	4,000
d	ea	1	4,000	4,000
Delineators	ea	340	5.00	4.25
Demolition & bldg removal, 1	ls	job	1.00	200.00
2	ls	job	1.00	200.00
Traffic officers, uniformed	mhr	350	2.25	3.00
Clear & trim	acre	1	400.00	1.00
Winter rye	lb	580	0.20	0.50
Seeding, slopes	lb	1,175	1.20	2.00
lawns	lb	150	1.20	3.00
Sodding	sy	1,050	1.00	2.00
Fertilizer, for grass, commercial	lb	14,600	0.05	0.15
Topsoil	cy	4,360	1.50	4.00
Mulch, mod	t	45	50.00	50.00

Completion date: 12/1/61

ENR Constr. Cost Index (1913=100) 20-cities avg.—854.01

"LEELIGHTS"
L-P GAS FLOODLIGHTS
At Work
PORTABLE
INSTANT LIGHTING
ALL WEATHER OPERATION
★
WM. W. LEE AND SON
20 EAST JACKSON BOULEVARD
CHICAGO 4, ILLINOIS
HA 7-7592 HA 7-1720



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To push the largest concrete tunnel shields or sewer pipe into place, to raise bridges, move buildings, to set reinforced concrete decking, to prestress concrete forms . . . for any jacking, lifting, pressing or pulling job requiring high-pressure hydraulic equipment, you can depend upon RODGERS Jacks. Immediate delivery, sizes from 50 to 600 tons. Outline your requirements to us and let our engineers suggest the equipment best suited to your needs. J-101D

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Materials Prices

Monthly Market Quotations by ENR Field Reporters

LUMBER, TIMBER, PLYWOOD— + *or* — *denote this price is higher or lower than last month's price*

See following ENR issues for OTHER PRICES:

- Clay Products, Lime, Plaster, Paint, Roofing: Last, Oct. 26; Next, Nov. 30.
- Wage Rates, Building Board, Lath, Insulation: Last, Nov. 2; Next, Nov. 30.
- Cement aggregate, Ready-Mixed Concrete, Asphalt: Last, Nov. 11; Next, Dec. 7.
- Iron & Steel Products Pipe: Last, Nov. 16; Next, Dec. 14

Item	Unit	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
LUMBER, TIMBER																							
1x6s4s	Pine Mbf.	82.00	85.00	80.00	.....	+104.00	91.00	+94.00	105.50	.....	108.00	−105.00	.....	102.00	−80.00	89.00b	.....	82.00	−85.50	.....	.....	79.00c	87.00c
	Fir	*109.25*	*99.00*	*102.00*	.....	*+101.00*	*92.00*	.....	.....	*96.00*	*−105.00*	*+78.00*	.....	.....	*−93.00*	*93.00*	.....	*96.00*	*−89.00*	*−72.00*	*60.00*	.....	.....
1x8s4s	Pine "	85.00	85.00	−81.00	.....	+107.00	93.00	+98.00	105.50	.....	110.00	−105.00	.....	104.00	−81.00	89.00	.....	82.00	−88.50	.....	.....	81.00c	91.00c
	Fir	*91.00*	*90.00*	*97.50*	*101.00*	*+103.00*	*94.00*	.....	.....	*98.00*	*−105.00*	*+73.00*	.....	.....	*−93.00*	*93.00*	.....	*82.00*	*−89.00*	*−72.00*	*65.00*	.....	.....
2x4s4s	Pine "	82.00	85.00	+100.00	98.00	+106.00	98.00	−105.00	107.50	.....	104.00	−100.00	.....	+100.50	−90.00	97.00b	+96.00b	82.00	+96.50	.....	.....	79.00c	+88.00c
	Fir	*106.50*	*105.00*	*104.00*	*108.00*	*+110.00*	*106.00*	*−110.00*	*99.25*	*99.50*	*107.00*	*−105.00*	*83.00*	.....	*−96.75*	*101.00*	*+105.00*	*112.00*	*+101.50*	*−80.00*	*75.00*	.....	*106.00*
2x6s4s	Pine "	83.00	87.00	+100.00	98.00	+106.00	98.00	99.00	107.50	.....	104.00	−105.00	.....	+100.50	88.00	97.00b	+96.00b	84.00	+93.50	.....	.....	79.00c	+88.00c
	Fir	*104.50*	*105.00*	*104.00*	*108.00*	*+110.00*	*106.00*	*+108.00*	*99.25*	*98.50*	*101.00*	*−110.00*	*83.00*	.....	*−96.75*	*101.00*	*+105.00*	*112.00*	*+101.50*	*−80.00*	*73.00*	.....	*106.00*
2x8s4s	Pine "	85.00	88.00	+99.00	98.00	+113.00	98.00	104.00	123.50	.....	114.00	−105.00	.....	+100.00	+90.00	97.75b	+96.25b	89.00	+94.50	.....	.....	95.00c	+91.00c
	Fir	*107.25*	*110.00*	*108.00*	*108.00*	*+113.00*	*107.00*	*+110.00*	.....	*97.50*	*110.50*	*−110.00*	*84.00*	.....	*−98.25*	*101.75*	*+105.75*	*112.00*	*+101.50*	*−80.00*	*73.00*	.....	*−107.00*
2x10s4s	Pine "	90.00	90.00	+102.00	113.00	+115.00	105.00	110.00	123.50	.....	118.00	−115.00	.....	+100.00	−95.00	100.00b	−97.00b	91.00	+106.50	.....	.....	125.00c	90.00c
	Fir	*−109.00*	*110.00*	*110.00*	*118.00*	*+118.00*	*112.00*	*+112.00*	.....	*100.50*	*118.00*	*−115.00*	*84.00*	.....	*−98.25*	*104.00*	*+106.50*	*114.00*	*+104.50*	*−80.00*	*75.00*	.....	*−108.00*
3x12Rgh	Pine "	105.00	+127.50d	105.00	.....	+125.00	112.50	.....	137.50	.....	.....	.....	.....	+122.25	−115.00	118.00b	.....	116.00	+125.00	.....	.....	.....	105.00c
	Fir	*123.25*	*126.00d*	*133.50*	*138.00*	*+125.00*	*130.00*	*136.00*	.....	*116.50*	*+183.00d*	*−135.00d*	*91.50*	.....	*−120.75*	*122.00*	*+123.25*	*130.00*	*125.00*	*−86.00*	*87.50*	.....	*−119.00*
6x12Rgh	Pine "	115.00	127.50d	105.00	148.00	+135.00	135.00	.....	171.00	.....	.....	.....	.....	111.50	116.00	118.00b	.....	116.00	+135.00	.....	.....	.....	.....
	Fir	*123.25*	*136.00d*	*133.50*	*158.00*	*+128.00*	*130.00*	*136.00*	.....	*114.50*	*+183.00d*	*−165.00d*	*91.50*	.....	*−120.75*	*122.00*	*+123.25*	*130.00*	*125.00*	*−106.00*	*91.00*	.....	*−123.00*
12x12Rgh	Pine "	130.00	128.50d	120.00	.....	+135.00	135.00	.....	176.00	.....	.....	.....	.....	112.50	−120.00	118.00b	.....	116.00	+135.00	.....	.....	120.00c	.....
	Fir	*129.25*	*136.00d*	*135.00*	.....	*+128.00*	*135.00*	*138.00*	.....	*107.50*	*+183.00d*	*−165.00d*	*91.50*	.....	*+120.75*	*122.00*	*+129.50*	*123.00*	*125.00*	*−107.00*	*91.00*	.....	*123.00*
FIR PLYWOOD (a)																							
⅜" Int. Plyscored, CD gr.	Msf.	125.00	125.00	−121.57	116.90	+140.00	116.45	118.00	125.00	110.25	116.45	−125.00	91.80	+117.45	122.25	115.20	109.20	122.50	113.37	94.00	94.00	119.25	−143.50
¾" Exterior Plyform, BB gr.	"	225.00	215.00	−196.21	211.40	+234.00	204.70	−205.50	212.50	210.00	204.70	−205.00	+152.60	+218.25	201.95	204.60	197.30	212.60	−200.93	−174.00	180.00	225.95	−225.00

Fir-Random length, 75% construction grade, 25% standard grade, 30,000 bf, green stock, grademarked. Pine-Random length, #2 common and better. Southern Pine Inspection Bureau grademarked, 30,000 bf. Lumber prices include freight from mill to city and cost of unloading and trucking full carlot to jobsite. •a Certificated stock, carlots, fob city. •b Hemlock, 75% construction grade, 25% standard grade. •c Spruce. Fir plywood prices, per Msf. fob Northwest mill: CD grade interior sheathing—½" $75-76, ⅝" $84-86; BB grade Plyform—⅝" $150.00, ¾" $170.00. •d Nominal. •e Exterior.

WINDOW GLASS,

Discounts from Jobber's list, Feb. 1, 1950 (a) sales tax extra—single or double strength

	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
A quality	78%	74%b	82%c	70+10%eg	70%	72%	72-2-10%	70%	73%-10	72-10-10%	76-10-10%	$12.88/17.32	70-10%	76%d	79%	80%	76%	74-10-10%ef	60%	$8.85/11.55di	40-10-5%a	$6.49/9.50
B quality	80%d	74%b	83%c	70+10%eg	70%	72%	72-2-10%	70%	73%-10	72-10-10%	76-10-10%	$10.45/14.13	70-10%	76%d	79%	80%	76%	74-10-10%e	73%	6.41/8.07di	40-10-5%a	5.90/8.77

Glass: •a Jobber's list price per box, 14 x 20, ss. $42.75 for A quality, $37.50 for B quality; 14 x 20, ds. $60.00 for A quality, $52.75 for B quality. •b sales tax extra. •c 77% for single strength. •d From 6/15/52 list. •e 77% for double strength. •f Single strength; double strength, 83%. •g From 8/1/58 list. •h ss/ds, 40-in. •i 20 boxes min. •, eff. 10/15/58. •m less 2% disc, 10 days. •n less 1% disc, 10 days. •o add 2% sales tax. •p less 1% for cash. •q less 2% for cash.

EXPLOSIVES

per lb, 40% Ammonia Gelatin in 50 lb cases delivered in 500 lb lots (non-seismograph grades)

Urban Areas	Atlanta	Baltimore	Birmingham	Boston	Chicago	Cincinnati	Cleveland	Dallas	Denver	Detroit	Kansas City	Los Angeles	Minneapolis	New Orleans	New York	Philadelphia	Pittsburgh	St. Louis	San Francisco	Seattle	Montreal	Toronto
	$0.2595	$0.2795	$0.2595	$0.2795	$0.2795	$0.2595	$0.2595	$0.2870	$0.2795	$0.2795	$0.2795	$0.2795	$0.2795	$0.2795	$0.5130g	$0.2795	$0.2595	$0.2795	$0.2795	$0.2795	$23.20h	.....

Explosives: Cartridges of 1¼" diameter or over, in standard lengths. •g deliveries in certain areas must be by truck or by truck and boat, requiring extra charge. •h fob Beloeil (near Montreal), per 100 lb., lots under 2000#, wood cases, forcite, 40%. Forcite 60% $24.30 in fiber cases; forcite 40%, $24.05; forcite 60%, $25.80. Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Non-Urban Areas	C.L. 30,000 lb. lots	10,000 lb. lots	2,000 lb. lots	200 lb. lots
Group 1*	$0.21.95	$0.22.95	$0.26.45	$0.27.95
Group 2†	.22.70	.23.70	.27.20	.28.70

*All areas except those in Group 2 and N.J. cities of Bayonne, Hoboken, Jersey City, No. Bergen, Union City and Weehawken †Florida counties of Manatee, Hardee, Highlands, Okeechobee, St. Lucie and south thereof; Idaho; Maine; Montana; New Mexico counties of Catron, Socorro, Lincoln, De Baca, Roosevelt and south thereof; Texas counties of Bailey, Lamb, Hale, Floyd, Motley, Cottle, Hardeman, Foard, Knox, Haskell, Jones, Taylor, Coleman, McCulloch, San Saba, Burnet, Williamson, Milan Robertson, Leon, Houston, Angelina, Nacogdoches, Shelby and south thereof.

PILES

prices per linear foot, fob cars, New York

Dimensions	Points	Length	—By Rail— Pine•§	Fir	Dimensions	Points	Length	—By Rail— Pine•§	Fir
12" at butt	6-in.	30 to 39-ft.	$0.42a	....	14"—2-ft. from butt	6-in.	65 to 69-ft.	1.21	....
12"—2-ft. from butt	6-in.	40 to 44-ft.	.91	....	14"—2-ft. from butt	6-in.	70 to 74-ft.	1.34	$1.40
12"—2-ft. from butt	6-in.	45 to 49-ft.	.97	....	14"—2-ft. from butt	6-in	75 to 79-ft.	1.41	1.40
12"—2-ft. from butt	6-in.	50 to 54-ft.	1.01	....	14"—2-ft. from butt	5-in.	80 to 84-ft.	1.54	1.45
12"—2-ft. from butt	6-in.	55 to 59-ft.	1.07	....	14"—2-ft. from butt	5-in.	85 to 89-ft.	1.67	1.54

• Pine piling over 90 feet available only in limited quantities. § ASTM Class B •a, trucked in from N. J.

Prices per linear foot, fir and pine, rough peeled, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine under fifty feet based on freight from mid/South, over fifty feet on freight from deep south.

RAILWAY TIES

Prices f.o.b. per tie box carload lots:		6" x 8" x 8' Untr.	6" x 8" x 8' Tr.	7" x 8" x 8'6" Untr.	7" x 8" x 8'6" Tr.
Birmingham*	Hardwood, Grade 3	$1.70	$2.55	Gr. 5 $2.25	$3.33
	Grade 2	1.50	2.35	" 4 2.10	3.18
	Grade 1	1.15	2.00	" 3a 1.70	2.78
Chicago	Red Oak	2.85-3.00	4.00a-4.10	3.90	4.75
New York	Mixed Hardwood	3.45	5.10	4.30	6.50
	Mixed Oak	3.55	5.20	4.40	6.60
Philadelphia	Mixed Oak	3.80	3.97	4.37	4.65-4.75
St. Louis	Mixed Oak	2.65h	3.75h	3.05h	4.10h
San Francisco	Douglas Fir	2.05e	3.30e	2.35ef	3.35ca

Tr.—Treated; Untr.—Untreated. •a Creosoted. •c Empty cell. •e Green •f f.o.b. cars. •g 7 x 9 x 8'6" • Add 75¢/tie freight charge to Birmingham. •h 7" x 9" x 8½. •i Mixed Hardwood

CHEMICALS

Water, sewage treatment, road work, carlots, f.o.b. works

Chlorine cylinders, liquid, per lb. freight allowed, N. Y. State	$ .11	Silicate of soda, 52 deg., in drums, per 100 lb.	2.65
Calcium chloride, 77-80%, flaked, 100-lb. paper bag, ton	32.00	Soda ash, 58%, in paper bags, per 100 lb. dense	1.90
		Sulphate of aluminum, commercial, in 100-lb. bags	2.05
		Sulphate of copper in bags, 99% per 100 lb., reg., 25.2% copper content	12.5

Construction Reports

Bid Asked—Low Bidders—Contracts Awarded—

NEW ENGLAND

BUILDINGS—BA

▲ **Mass., Boston**—BA 12/5—Boston University, 755 Commonwealth Ave., LAW and EDUCATION BLDG. and HEATING PLANT. $2,000,000. Extended date. Edwin T. Steffian, 711 Boylston St., archt. CD 11/9/61.

MIDDLE ATLANTIC

BUILDINGS—BA

▲ **N. J., Hackensack**—BA 11/28—Hackensack Hospital Assn. of Hackensack General Hospital, 22 Hospital Place, 6 story, 120 bed HOSPITAL WING, Hospital Place. $3,300,000. Extended date. Crow, Lewis & Wick, 200 Fifth Ave., New York, N. Y., archts. A. A. Abdalian, 468 Park Ave. South, New York, 16, N. Y., struc. engr. CD 11/8/61.

BUILDINGS—BA

▲† **N. Y., West Point**—BA 12/13—U. S. Eng., 111 E. 16 St., New York, Zone 3, CADET LIBRARY, U. S. Military Academy, ENG-30-075-62-55. $4,000,000. CD 10/12/61.

▲ **N. Y., New York**—BA 12/13—At Office Rogers & Butler, archts., 219 East 44 St., Zone 11, 11 story MEDICAL RESEARCH LABORATORY, East 68 St., between First and York Aves. for Memorial Center for Cancer, 444 East 68 St., $5,000,000. Jaros-Baum-Bolles, 415 Lexington Ave., Zone 17, mech. engrs. Seeley-Stevenson-Value & Knecht, 101 Park Ave., Zone 17, struct. engrs. CD 7/21/61.

▲† **Pa., Pittsburgh**—BA 12/19—General Services Admin., 250 Hudson St., New York 13, N. Y., 23 story, 795,000 sq. ft. FEDERAL OFFICE BLDG., South of Liberty Ave., between Grant St. and Wm. Penn Way, Proj. No. 36901, $15,000,000. Prack & Prack-Aitenhof & Bown, Martin Bldg., archt. Geo. M. Levinson, 701 Locust St., struct. engr. CD 12/6/59.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, Bids opened 11/16, ROADS,

L. G. DeFelice & Son, Inc., Nettleton Ave., North Haven, Conn., LB **$3,112,331.60**, est. $3,897,000 (6 bidders), 9 in. c. conc. pavt. 4.18 mi. (2.28 acc.) misc. work 0.17 mi., H.G.S. comp. I-beam Delmar By-Pass, Part 1 (Elm Ave. to Rte. 9W), Albany-Bethlehem Center, SH 5499 FASH 61-24, FARC 61-157, Proj. U-1129(2), Albany Co.

N. Y.—D. W. Winkelman Co., Inc., 300 Long Branch Rd., Syracuse 9, N. Y., LB **$2,036,900.50**, est. $2,572,000 (10 bidders), 9 in. c. conc. pavt. 3.03 mi., misc. work 0.24 mi. 2 HGS Comp. I-beam and plate gird., 1 HGS comp. I-beam Interstate Rte. 505 (Nedrow to Syracuse City Line), Syracuse-Lafayette, SH 5365, Rte. 81 & 11, FISH 61-21, Proj. I-81-2(65), Onondaga Co.

N. Y.—Hendrickson Bros., Inc., 63 N. Central Ave., Valley Stream, N. Y., LB **$3,775,050**, est. $4,523,000 (7 bidders), 9 in. c. conc. pavt. 3.36 mi. 2 HGS twin comp. WF beam bridges, 2 HGS comp. WF beam bridges, misc. work 0.19 mi. Long Island Expwy. Cont. 13, Islip Ave. (Caleb's Path) to Veterans Memorial Hy., FALIE 61-5, Proj. F-862(36), Suffolk Co.

N. Y.—Gil Wyner Co. Inc., 12 Newland St., Malden 48, Mass. LB **$3,604,214**, est. $4,273,000 (3 bidders) b. conc. 10.56 mi., misc. work, constr. causeway Whitehall Village; Canal and Broad Sts. SH 5531, Whitehall-Dresden Center, Part 1, SH 5578, South Bay Bridge, SH 9113, Whitehall-Dresden Center, Part 2, SH 5637A Whitehall-Dresden Center, Part 3; Dresden Center Dresden Station, SH 8132, Dresden Station-Putnam, Rte. 22, SH 8225. FARC 61-154. Proj. F-0371(6), Washington Co.

N. Y.—Colonial Asphalt Paving Corp., 92 W. First St., Mt. Vernon, N. Y. LB **$3,596,091.80**, est. $4,103,000 (5 bidders), 8 in. c. conc. pavt., misc. work 0.06 mi. rein.-con. closed box culvert, HGS WF comp. beam, conc. retaining wall Sprain Brook Parkway, Tuckahoe Rd. to Jackson Ave. SBP 61-1, Westchester Co.

N. Y.—Grandview Const. Corp., 740 S. Fulton Ave. Mt. Vernon, N. Y. LB **$3,389,314.50**, est. $3,573,000 (2 bidders) 8 in. conc. pavt 3.95 mi., misc. work 0.27 mi. 2 HGS rein. con. rigid frame Taconic State Parkway realignment through Mohansc Park (Baldwin Rd. to Crompond Rd. TSP 61-1, Westchester Co. CD 10/16/61.

N. Y.—Merritt Chapman & Scott Corp., 260 Madison Ave., New York 16, N. Y. LB **$10,427,622.50**, est. $11,010,000 (2 bidders), 8 and 9 in. c. conc. pavt. 3.72 mi. (5.42 acc.) riveted steel rig. frame structure welded thru plate girder struct., 2 ped. overpass comp. WF beam, 2 ped. overpass WF beam, 1 ped. overpass welded plate girder, 3 comp. WF cantilever suspension, 1 WF beam plus alterations, wid'n. ext. WF beam bridge Grand Central Parkway, Sect. 2, Contr. 1, (Roosevelt Ave. to 77 Ave.) Int. Rte. Conn. 514 (Grand Central Pkwy. Horace Harding Expwy. Interchange) Rte. 495 FAGCP 61-5 FIHHE 61-2. Proj. U-UG(5); I-495(48), Queens Co. CD 10/25/61.

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, ROAD,

Gull Contg. Co., Inc., 23-15 Lawrence St., Flushing 54, N. Y., CA **$9,995,813**, est. $11,290,000, 8 in. c. conc. pavt. 2.67 mi. (4.23 acc.) 3 hy. gr. seps. comp. I-beam, 2 ped. overpass I-beam, rehab. I-beam and conc. rigid fr. underpass, rehab. comp. I-beam and girder viad. Grand Central Pkwy. Sect. 1, Contr. 1 (Brooklyn-Queens Expky.) to Northern Blvd. Interchange. FAGCP 61-6. Proj. I-889(4), Queens Co. BA 10/26. CD 10/27/61, under LB.

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, ROAD,

Tully & DiNapoli, Inc., 127-50 Northern Blvd., Corona 68, N. Y., CA **$8,651,405**, est. $9,676,000, b. conc. 4.19 mi., misc. work HGS conc. arch 2 sps. 146 ft. HGS comp. I-beam 2 sps. 158 ft. HGS comp. I-beam and prestressed conc. 1323 ft. Int. Rte. Conn. 515 Whitestone Expwy. Contr. 1, (Flushing River Bridge to Whitestone Bridge, Rte. 678, FIWE 61-1, Proj. EI 678-1(64), Queens Co. BA 10/5. CD 10/6/61, under LB.

▲ **NEW YORK**—Triborough Bridge and Tunnel Auth., Admin. Bldg., Randall's Island, New York, Zone 35, BRIDGE,

Slattery Contg. Co., Inc., 46-36 54 Rd., Maspeth, N. Y., CA **$8,522,869**, Narrows Bridge, Contr. No. NB-11, Staten Island APPROACH and PLAZA, incl. grading, concrete, and steel structures and paving. BA 11/1. CD 11/3/61 under LB.

▲ **General Railway Signal Co.**, 230 Park Ave., New York 17, N. Y., CA **$11,090,960**, furnishing, installing modern BLOCK SIGNAL and INTERLOCKING SYS. for Broadway-7th Ave. Line IRT-Div. Section 1, 96 St. to 157 Sts., Section 2, 157 St. to 242 St., incl. 240 Street Yard Contr. S-104, Manhattan and Bronx Boros, NEW YORK, N. Y. New York City Transit Auth., 370 Jay St., Brooklyn 1, N. Y. BA 10/16, CA 11/9. CD 10/18/61, under LB.

▲ **Merritt-Chapman & Scott Corp.**, 260 Madison Ave., New York 16, N. Y., LB **$3,548,100**, (7 bidders), Proj. D-275, 635 ft. long, 100,000 sq. ft. shed area Newsprint SHIPPING TERMINAL, between Montgomery and Jackson Sts., East River, NEW YORK, N. Y. Marine & Aviation, Battery Maritime Bldg., New York 4, N. Y. Furness-Withy & Co. Ltd., 34 Whitehall St., New York 4, N. Y., lessee. BA 11/6. CD 4/21/61.

▲ **NEW JERSEY**—State Hy. Dpt., 1035 Parkway Ave., Trenton, ROAD,

Public Constructors, Inc., Erial Rd., Blenheim, Blackwood, N. J., CA **$3,630,005**, interchange connection Interstate Rte. 287 and U. S. Rte. 1, Metuchen Boro and Edison Township, Middlesex Co. BA 10/11/61, CA 11/9/61. CD 10/13/61, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, Bids opened 11/10, ROADS,

Pa.—Collins & Maxwell Road-Builders, Inc., Easton, Pa., LB **$1,050,140**, (4 bidders), 19,474 ft. constr. divided hy. and two bridges, Rte. 309, Berks & Lehigh Counties;

Pa.—J. Robert Brazley, Inc., Box 298, Pottsville, Pa., LB **$4,134,290**, (3 bidders), 20,190 ft. divided hy. RCC, Rte. 29, Carbon Co.;

Pa.—Bero Constr. Corp., Box 70, Waterloo, N. Y., LB **$2,474,741**, (8 bidders), 28,200 ft. divided hy. RCC, Interstate 81, Sect. Cumberland Valley Freeway, Franklin Co.;

Pa.—Reed & Kuhn, Inc., Elysburg, Pa., LB **$1,564,283**, (8 bidders), 4,651 ft. divided hy. Interstate 81, Sect. Anthracite Expressway, Lackawanna Co. CD 10/17/61.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, ROADS,

Pa.—Lycoming Constr. Co., 127 Susquehanna St., Williamsport, Pa., CA **$3,017,750**, 21,010 ft. reinf. c. conc. pvt., 24 ft. wide and 5 bridges, L.R. 1009 (82) Sec. Keystone Shortway, Interstate, Montour Co.; CA **$2,664,933**, 22,802 ft. separate hy. consisting of c. conc. pvt., 24 ft. wide and 5 bridges, L.R. 1009(91), Sec. Keystone Interstate, Northumberland and Montour Counties,

Pa.—Bertocci Constr. Co., R.D. 2, Perryopolis, Pa., CA **$1,499,125**, 15,905 ft. divided hy. c. conc., 24 ft. wide each side conc. divisor, alt. bridge superstructure, T.R. 22, Indiana. Grand total $7,818,808. BA 9/29/61. CD 10/4/61 and 8/31/61, under LB.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, ROAD,

Bero Constr. Corp., Box 70, Waterloo, N. Y., CA **$3,874,381**, 38,313 ft. constr. of divided hy. with c. conc. pvt. 24 ft. on each side, also 8 bridges, L.R. 799(2), Interstate Rte. 81, Franklin Co. BA 10/13/61. CD 10/18/61, under LB.

BUILDINGS—LB & CA

▲ **Jules Schneider, Inc.**, 556 Peninsula Blvd., Hempstead, N. Y., CA Est. **$5,000,000**, Commack Plaza SHOPPING CENTER, Jericho Turnpike and Veterans Memorial Highway, COMMACK, N. Y. Irving Berger & Assocs., 3000 Hempstead Turnpike, Levittown, N. J. (Correction-contractor). CD 8/30/61, under CA.

▲ **Caristo Constr. Corp.**, 26 Court St., Brooklyn 1, N. Y., LB **$4,384,000**, (7 bidders), fdns. and general constr. RICHMOND TERRACE HOUSES, Proj. No. NY-5-39, Richmond Ter., Westervelt Ave., Cleveland St., Beechwood Ave., Crescent Ave. and Jersey St., Richmond Boro, WEST NEW BRIGHTON, N. Y. New York City Housing Auth., 299 Broadway, New York 7, N. Y., BA 11/14, CD 10/19/61;

H. Sand & Co., 250 W. 57 St., New York 19, N. Y., LB **$689,675**, (2 bidders), heating and ventilating, Richmond Terrace HOUSES, (West New Brighton, N. Y.);

Dropkin Bros. Inc., 169 E. 69 St., New York 21, N. Y., LB **$515,584**, (3 bidders), electrical work, Richmond Terrace HOUSES, (West New Brighton, N. Y.);

Forsythe Plumbing & Heating Corp., 234 W. 55 St., New York 19, N. Y., LB **$707,000**, (6 bidders), plumbing, Richmond Terrace HOUSES, (West New Brighton, N. Y.).

▲ **B. J. Lucarelli & Co Inc.**, 1100 McCarter Hy., Newark, N. J., CA **$4,000,000**, 1-15 story APARTMENT, ASBURY PARK, N. J. Shore Assocs., c/o Tito P. DiVincenzo, archt., 136 East 57th St., New York, N. Y. (Correction—contractor). CD 5/4/61, under CA.

▲ **John Panella**, 1120 George St., Plainfield, N. J. Owner Builds, **$6,000,000**, 300 HOUSES, Washington Valley Rd., BRIDGEWATER, N. J. Ellsworth Giles, 35 Olcott Sq., Bernardsville, N. J., archt. M. S. Lipschultz, 174 Leach Ave., Park Ridge, N. J., engr.

▲ **Marshall Saxe**, 5 Spring St., New Brunswick, N. J., Owner Builds, **$3,500,000**, 2 story, 342 unit Colonial Village Garden APARTMENT, EAST BRUNSWICK, N. J. Gerber & Pancani, 11 Commerce St., Newark, N. J., archts.

▲ **Wark & Co.**, 1920 Sansom St., Phila., Pa., CA, DISTRIBUTION CENTER, KING OF PRUSSIA, PA. Western Electric Co., 195 Broadway, New York City, N. Y. BA 10/26/61. CD 10/20/61.

▲ **Campanelli Bros.**, 1 Campanelli Drive, Braintree, Mass., Owner Builds, **$5,000,000**, RESIDENTIAL DEVELOPMENT, (500) Tolbut St., etc., PHILA., PA.

SOUTH

BUILDINGS—BA

▲ **Va., Fairfax**—BA 11/28—Fairfax County Bd. Educ., Fairfax, James Fenimore Cooper INTERMEDIATE SCHOOL. Plans deposit $75. Pickett & Seiss, 110 Gordon Rd., Falls Church, archts. CD 3/4/60.

HEAVY CONSTRUCTION—LB & CA

▲ **Beers Constr. Co.**, 70 Ellis St., NE, Atlanta, Ga., CA **$2,776,150**, HANGAR-MAINTENANCE BLDG., at Atlanta Municipal Airport, ATLANTA, GA. City, City Hall, Atlanta, Ga. Eastern Airlines, Inc., lessee. BA 10/30/61. CD 11/3/61, under LB.

▲ **KENTUCKY**—Commonwealth Ky., Dpt. Hys., Frankfort, Bids opened 11/10, ROADS,

Ky.—Ralph Rogers & Co., S. Adams St., Bloomington, Ind., LB **$1,911,651** (1 bidder), grading, drainage on turnpike and grading, drainage, surf. service rd. 4.45 mi. West Kentucky Turnpike, WK 6-101, Ohio Co.; LB **$1,138,326** (1 bidder), grading, drainage on turnpike and grading, drainage, surf. service roads 3.172 mi. West Kentucky Turnpike, WK 6-1-2, Butler and Grayson Counties; LB **$1,143,412** (6 bidders), grading, drainage, surf. service roads 7.784 mi. West Kentucky Turnpike, WK 82, Hardin Co.;

Ky.—Mattingley Bridge, 317 Wallace Ave., St. Matthews, Ky., and **Kentucky Rd. Oiling Co.**, 315 High St., Frankford, Ky., LB **$2,156,596** (4 bidders), grading, incidental constr. 3.114 mi. Salyersville-Prestonburg S 267(5), Floyd Co.;

Ky.—Green Constr. & Coal Co., Oaktown, Ind., LB **$2,482,802**, (10 bidders), combination bid; 4.4 mi. grading, drainage on turnpike and grading, drainage and surf. service roads; and 3.172 mi. grading, drainage on turnpike and grading, drainage, surf. service roads West Kentucky Turnpike, Ohio, Butler and Grayson Counties, WK 6-1-1; WK 6-1-2. CD 10/25/61.

BUILDINGS—LB & CA

▲ **Thompson & Street Co.**, 2622 Piedmont Rd., NE, Atlanta, Ga., CA **$3,738,750**, AGRICULTURAL-ATHLETIC COLISEUM at University of Georgia, ATHENS, GA. Bd. Regents, University System of Georgia, 244 Washington St., SW, Atlanta, Ga. BA 10/11/61. CD 10/18/61, under LB.

▲ **George Constr. Corp.**, 321 NW 39th Ave., Miami, Fla., CA Est. **$2,500,000**, 245 RESIDENCES, COCOA BEACH, FLA. Jerry Orseck & George Blank, c/o contractor.

▲ **Frank J. Rooney, Inc.**, 5880 NE 4th Ave., Miami, Fla., CA Est. **$3,000,000**, 240 units APARTMENTS, MIAMI, FLA. Point View Apartments No. 2, c/o Charles McKirahan, archt., 2400 E. Oakland Park Blvd., Fort Lauderdale, Fla.

▲ **Frank A. Martin**, 410 71st St., Miami Beach, Fla., Owner Builds, **$3,500,000**, 400 RESIDENCES, Plantation Key and Venetian Shores, TAVENIER, FLA. Manfred M. Ungaro, 4100 N. Miami Ave., Miami, Fla., archt. CD 8/18/61, under Fla., Marathon.

▲ **Dunn Constr. Co.**, 2508 3rd Ave. N., Birmingham, Ala., CA **$2,312,958**, W. P. Davidson SENIOR HIGH SCHOOL, Pleasant Valley and Azalea Rds., MOBILE, ALA. Bd. School Comrs., 504 Government St., Mobile, Ala. BA 10/31/61. CA 11/8/61. CD 11/8/61, under LB.

▲ **Clark Constr. Co.**, 1919 Parrish Ave., Owensboro, Ky., CA **$2,425,900**, ACADEMIC-ATHLETIC BLDG., Western State College, BOWLING GREEN, KY. Commonwealth Ky., Div. Purchases, Frankfort, Ky. BA 11/6, CA 11/13. CD 11/14/61, under LB.

▲ **R. K. and A. Jones, Inc.**, P.O. Box 297, St. Louis, Mo., CA Est. **$4,000,000** general contract MOTEL, SWIMMING POOL, RESTAURANT, Dixie Hy., SOUTH FORT MITCHELL (COVINGTON), KY. Holiday Inn Motel, Inc., 1525 S. Glenston, Springfield, Mo. R. P. Stahl, 1465 S. Glenstone, Springfield, Mo., archt.-engr.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲† Ohio—BA 1/9—U. S. Eng., foot of Bridge St., Buffalo 7, N. Y., DEEPENING 1,387,000 cu. yd. material and 64,000 cu. yd. ledge rock SANDUSKY HARBOR. $3,900,000. CD 10/4/61.

BUILDINGS—BA

▲ Ill., Urbana—BA 11/28—University of Illinois, Admin. Bldg., general, electric, plumbing, heating, ventilating, insulating contracts for 5 story, bsmnt. SCIENCES BLDG. University of Illinois, $4,000,000. Plans deposit $100. E. L. Stouffer, Rm. 256, University of Illinois, archt. Naess & Murphy, 224 S. Michigan Ave., Chicago. archts. CD 6/13/61.

HEAVY CONSTRUCTION—LB & CA

▲ OHIO—State Hy. Dpt., State Depts., Bldg., Columbus, Zone 15, Bids opened 11/14, ROADS,

O.—S. J. Groves & Sons Co., Inc., Box 8, Ann Arbor, Mich. LB $1,471,212, est. $1,418,600, (3 bidders), relocating US 50 to form part of bypass around Coolville, incl. imprv. State Rte. 7, two bridges, 2 mi. limited-access highway, Proj. 705, Athens Co.;

O.—Miller Bros., Inc., & Harper Supply Co., Inc., RFD 2, Napoleon, O., LB $2,406,126, est. $3,080,900, (8 bidders), relocating US Rte. 24, to west and north of city of Defiance, incl. abt. 6 mi. limited access highway two diamond type interchanges at State Rtes. 15 and 18 and at State Rte. 66 and Bridges over Tiffin and Maumee Rivers, Proj. 708, Defiance Co.;

O.—A. J. Baltes, Inc., 11 Olive St., Norwalk, O., LB $4,561,749, est. $4,869,400, (5 bidders), relocating US Rte. 6 and State Rte. 2 to form the Sandusky By-pass, incl. 5 mi. 4-lane, limited access highway with depressed median 84 ft. widen, interchanges at existing USR 6 and State Rte. 12 and grade separation structures State Rte. 99, Nickel Plate RR Big Four RR, relocated Homegardner Rd., Pennsylvania RR and Mills Creek, Proj. 709, Erie Co. CD 10/23/61.

▲ MICHIGAN—State Hy. Dpt., 732 Mason Bldg., Lansing, 26, Bids opened 11/8, ROADS,

Mich.—Gilliland Constr. Co., Box 57, Alpena, Mich., LB $2,404,433, 5.7 mi. I-75 from vicinity of Rudyard south to County Rd. 1052 incl. grade separations at M-48 and County Road 1052, Chippewa and Mackinac Counties;

Mich.—Bacco Constr. Co., US-2, Iron Mountain, Mich., LB $1,067,991, 4.6 mi. wid'n. US-2 from 2 to 5 lanes from Howell St. in Bessemer east to existing four-lane US-2 in Wakefield, Gogebic Co. CD 6/27/61.

▲ MICHIGAN—State Hy. Dpt., 732 Mason Bldg., Lansing 26, ROADS,

Mich.—Canonie Constr. Co., U. S. 31 and M 43, South Haven Mich., CA $4,130,889, 7.1 mi. I-94 from Cotton Rd. southwest of New Baltimore north to Macomb-St. Clair County Line about 2 mi. north, incl. interchanges at M-29 (23-Mile Rd.) M-19 (New Haven Rd.) and 26-Mile Rd., grade separation at County Line Rd. and twin bridges over Salt River about 1 mi. northwest of New Baltimore, Macomb Co., CA 11/15;

Mich.—Cooke Contg. Co., 116 Penobscot Bldg., Detroit, Mich., C. J. Rogers, Inc., 14836 Grand River, Detroit, Mich. and Jutton-Kelly Co., 13240 Albert Ave., Dearborn, Mich., CA $3,358,170, 1.8 mi. Southfield Freeway from Schoolcraft Ave. north to McNichols Rd. incl. vehicular bridges at Grand River, Fenkell, Puritan and McNichols and pedestrian bridge at Tournier also pumphouses at Fenkell, Puritan and McNichols, Wayne Co. BA 10/25, CA 11/7. CD 10/31/61, under LB.

BUILDINGS—LB & CA

▲ The Hunkin-Conkey Constr. Co., 1740 E. 12th St., Cleveland, LB $7,572,700, (2 bidders), 782 unit low-cost RIVERVIEW TERRACE HOUSING, between W. 25th St. and Cuyahoga River, CLEVELAND, O. Cleveland Metropolitan Housing Auth., 1332 W. 28th St., Cleveland 13, O. BA 11/9/61. CD 10/6/61.

▲ Malan Constr. Co., 2 Park Ave., New York, N. Y., LB $4,460,000, (5 bidders), general contract, STATE HOSPITAL for MENTALLY RETARDED, CENTRALIA, ILL. State Dpt. Mental Health, State Office Bldg., Springfield, Ill. BA 11/7/61. CD 10/2/61;

Economy Plumbing & Heating, 7777 Gross Ave., Skokie, Ill., LB $1,877,000, (6 bidders), High Temperature Water System for STATE HOSPITAL for MENTALLY RETARDED (Centralia, Ill);

Fowler Plumbing & Heating Co., 217 E. 2nd St., Centralia, Ill., LB $1,989,000, (5 bidders), heating contract for STATE HOSPITAL for MENTALLY RETARDED (Centralia, Ill.);

H. F. Blades, Inc., 610 N. Water St., Decatur, Ill., LB $993,986, (4 bidders), electric contract for STATE HOSPITAL for MENTALLY RETARDED (Centralia, Ill.);

Rust Constr. Co. & Dahm Plumbing Co., 920 W. A St., Belleville, Ill., LB $1,350,000, (5 bidders), plumbing contract for STATE HOSPITAL for MENTALLY RETARDED; LB $572,231, (7 bidders), ventilating contract for STATE HOSPITAL for MENTALLY RETARDED (Centralia, Ill.).

▲ City of Chicago, Water Distribution Div., Dpt. Water & Sewer, City Hall, Chicago, Ill., Own Forces, $5,000,000, 57,000 lin. ft. 16- to 60-in. FEEDER MAINS, CHICAGO, ILL. CD 5/3/61.

▲ Feimley-Dickerson Co., 311 E. Lafayette St., Bloomington, Ill., LB $2,467,000, general contract 1,000-bed DORMITORY STUDENT UNION BLDG., DEKALB, ILL. Northern Illinois University, DeKalb, Ill. BA 11/3/61. CD 10/23/61.

H. P. Reger & Co., 1501 E. 72nd Pl., Chicago 19, Ill., LB $490,633, heating contract form DORMITORY, STUDENT UNION BLDG. (DeKalb, Ill.).

▲ Miller Davis Co., 1029 Portage St., Kalamazoo, Mich., CA Est. $4,000,000, 4 story TECHNICAL CENTER, administration bldg., BATTLE CREEK, MICH. Kellogg Co., 235 Porter St., Battle Creek, Mich. Giffels & Rosetti, Inc., Marquette Bldg., Detroit, Mich., archt. CD 11/16/61.

▲ Fluor-Singmaster & Breyer, Inc., sub. The Fluor Corp. Ltd., 2500 S. Atlantic Blvd., Los Angeles, Calif., CA Est. $3,000,000, PROPYLENE OXIDE PLANT, WYANDOTTE, MICH. Wyandotte Chemicals Corp., 1609 Biddle Ave., Wyandotte, Mich. CD 6/9/61.

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BUILDINGS—BA

▲ Colo., Denver—BA 11/28—F. R. B. Corp., c/o Ramsey & Reeves, archts., 882 S. Lipan St., 12 story MEDICAL OFFICE, 140,000 sq. ft. off-street parking. $3,500,000. CD 9/7/61.

▲† Mo., Fort Leonard Wood—BA On Or About 12/19—U. S. Eng., 1800 Federal Bldg., Kansas City 6, Mo., 3rd Increment, 1st Regimental Area, three 2-company, 40,600 sq. ft. each EM BARRACKS, 13,300 sq. ft. CONSOLIDATED MESS, approx. 12,200 sq. ft. ADMINISTRATIVE and STORAGE BLDG., GROUP HEATING PLANT ADDN., SITE IMPRVS., etc., ENG-23-028-62-21. $3,000,000. Plans deposit $10. CD 9/18/61.

HEAVY CONSTRUCTION—LB & CA

▲† Van Burkirk Constr. Co., 215 Benson Bldg., Sioux City, Iowa, CA $2,381,602, relocating 13.8 mi. RAILROAD outside Norton Dam Reservoir area, Almena Unit, Missouri River Basin Project, DC 5645, northwestern KANSAS. Bureau Reclamation, Dpt. Interior, Bldg. 53, Denver Federal Center, Denver 25, Colo. BA 9/19/61. CD 9/22/61, under LB.

▲ English Electric Co., Ltd., 14 Strachan St., Toronto, Ont., Canada, CA $2,557,400, HYDRAULIC TURBINES for Markham Ferry Dam Power Plant, Vinita, OKLAHOMA. Grand River Dam Auth., Vinita, Okla. BA 8/15/61. CD 8/22/61, under LB.

▲ McVean & Barlow Pipeline Constr., Kermit Hy., Box 151, Odessa, Tex., CA Est. $4,885,000, 225 mi. 8 in. PRODUCTS LINES, El Paso to Midland, TEXAS. Pasotex Pipeline Co., Box 1022, El Paso, Tex. CD 7/20/55.

BUILDINGS—LB & CA

▲ Dresser Engineering Co., 108 N. Trenton St., Tulsa, Okla., CA Est. $8,000,000, NATURAL GAS PROCESSING PLANT, HENNESSEY, OKLA. Humble Oil & Refining Co., 1216 Main St., Houston, Tex., CD 1/5/61;

Luther G. Harper, 6645 N .Peoria St., Tulsa, Okla. CA, 85 mi. GATHERING and TRUNK LINE, (Hennessey, Okla.).

▲ Dresser Engineering Co., 108 N. Tremont St., Tulsa, Okla., CA Est. $3,000,000, 150 million cu. ft. daily of gas, 85,000 gal. products, NATURAL GASOLINE PLANT, 17 mi. NW of FREER, TEX. Phillips Petroleum Co., 6910 Fannin St., Houston, Tex. CD 10/27/61.

▲ Lillie Lumber & Bldg. Co., 5811 Overdale St., Houston, Tex., Owner Builds, $3,000,000, 200 brick veneer DWELLINGS, Sec. 3, Crestmont Park Subdivision, HOUSTON, TEX.

▲ Hudson Engineering Corp., 5900 Hillcroft St., Houston, Tex., CA, 32 million cu. ft. per day NATURAL GAS PROCESSING PLANT, NORMANNA, TEX. Tidewater Oil Co., Mellie Esperson Bldg., Houston, Tex.

FAR WEST

HEAVY CONSTRUCTION—BA

▲† Utah, Hill Air Force Base—BA 12/19—Procurement Air Force Base, 300 HOUSING units, Hill Air Force Base. $6,000,000. Extended date. Snedaker, Budd and Monroe & Assocs., 12 Post Office Pl., Salt Lake City, archts. CD 10/9/61.

BUILDINGS—BA

▲ Calif., Berkeley—BA 12/5—Regents of University of California, Architects and Engineers Office, 2 Barrow Lane, 4 floors above grade, 2 below, rein.-con. pretensioned rein.-con. Etcheverty ENGINEERING HALL, Unit I, University of California. $4,500,000. Plans deposit $125. Skidmore, Owings & Merrill, 1 Bush St., San Francisco, archts. CD 5/9/60.

▲ Calif., San Francisco—BA 12/20—City and San Francisco Co., Dpt. P. Wks., City Hall, rehab. CIVIC CENTER AUDITORIUM, Proj. 1955. $6,200,000. Plans deposit $300. Civic Center Auditorium Archts. & Engrs., Public Structures, Inc. (Wurster Bernardi & Emmons, 1620 Montgomery St., San Francisco, Calif. and Skidmore, Owings & Merrill, 1 Bush St., San Francisco, Calif.), archts. CD 11/9/59.

▲† Wash., Fort Lewis—BA 12/20—U. S. Eng. 1519 S. Alaskan Way, Seattle, Zone 4, 500 unit CAPEHART FAMILY HOUSING, Proj. 62-20, $8,000,000. Extended date. CD 10/18/61.

BUILDINGS—SLC

▲ Calif., San Francisco—Theo Rosenberg & Assocs., c/o Schram & White, archts., 414 Mason St., (soon lets contract), 11 story 65 unit APARTMENT,

swimming pool, parking facilities in lower level, $2,500,000. •Robinson & Giddings, 80 Stonestown, engrs. CD 10/31/61.

HEAVY CONSTRUCTION—LB & CA

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 11/9, ROAD,
Fredrickson & Watson Constr. Co., Jack L. Adams Constr. Co. and Wade G. Ellis Constr. Co., 873 81 Ave., Oakland, Calif., LB **$7,340,424** (8 bidders), 1.6 mi. eight lane freeway on San Diego Freeway between California Ave. in Signal Hill and Long Beach Freeway, incl. 11 structures, Los Angeles Co. CD 9/27/61.

▲ **Clancy M. O'Dell Constr. Co.,** P.O. Box 5106, Baltimore, Md., LB **$11,169,895** (10 bidders), Proj. HH WS 349, Canyon Power TUNNEL and related work, Stanislaus National Forest and Yosemite National Park, Tuolumne Co., SAN FRANCISCO, CALIF. City and San Francisco Co., P. Utility Comn., City Hall, San Francisco, Calif. BA 11/9. CD 10/20/61.

▲ **HAWAII**—State Hy. Dpt., 869 Punchbowl St., Honolulu, ROAD,
E. E. Black, Ltd., 1067 Kawaishao St., Honolulu, Hawaii, and **Kuwaye Bros. Ltd.,** 821 Kanoelehua St., Hila, Hawaii, CA **$2,461,944**, Hawaii Belt Road, Proj. F-019-1-(1), Unit 2, South Kohala, Hawaii Co. BA 10/26/61, CA 11/10/61. CD 11/3/61, under LB.

BUILDINGS—LB & CA

▲ **Jelco, Inc.,** 421 West 13th South, Salt Lake City, Utah, LB **$2,493,783**, est. $2,213,781, (2 bidders), MECHANICAL work on MEDICAL CENTER, University of Utah, SALT LAKE CITY, UTAH. Utah State Bldg. Bd., Room 415, State Capitol, Salt Lake City, Utah. BA 11/7/61, CD 10/10/61;
Interstate Electric Co., Inc., 550 West 7 South, Salt Lake City, Utah, LB **$879,000**, est. $1,038,988, (6 bidders), ELECTRICAL work on MEDICAL CENTER, University of Utah, (Salt Lake City, Utah).

▲ **Utah Constr. & Mining Co.,** 550 California St., San Francisco, Calif., LB **$3,419,222** Base Bid (8 bidders), 9 floor, rein.-con. BARROWS HALL, BERKELEY, CALIF. Regents of University of California, c/o Architects & Engineers, University of Calif., Berkeley, Calif. BA 10/31. CD 10/10/61.

▲ **Merco Constr. Engineers,** 1704 Ruxton Lane, Redondo Beach, Calif., CA **$2,951,854**, est. $2,885,000, Mulholland JUNIOR HIGH SCHOOL (formerly Birmingham Junior High School, Van Nuys, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. BA 10/13. CA 11/6. CD 10/17/61, under LB.

▲ **The Contracting Engineers Co.,** 2310½ W. Vernon Ave., Los Angeles, Calif., CA Est. **$3,000,000**, Foothills Square SHOPPING CENTER, OAKLAND, CALIF. The Draper Companies, Russ Bldg., San Francisco, Calif. CD 10/23/61.

▲ **Haas & Haynie Corp.,** 244 Pine St., San Francisco, Calif., CA **$6,000,000**, 10 story, 338-unit, poured in place concrete Channing House APARTMENT, PALO ALTO, CALIF. Palo Alto Medical Research Foundation, Channing House Bd. Trustees, 752 Bryant St., Palo Alto, Calif. John Graham & Co., 1426 Fifth Ave., Seattle, Wash., archts. CD 4/22/60.

▲ **F. E. Young Constr. Co.,** P. O. Box 2872, San Diego 12, Calif., CA **$2,307,000**, Samuel F. B. Morse HIGH SCHOOL, 69 and Skyline Dr., SAN DIEGO, CALIF. San Diego Unified School Dist., 4100 Normal Blvd., San Diego 3, Calif. BA 11/7, CA 11/8. CD 11/10/61, under LB.

▲ **Stolte, Inc.,** 8451 San Leandro Ht., Oakland, Calif., LB **$5,078,000** (6 bidders), 6 floors and incomplete 7th floor, 245,000 sq. ft. COUNTY COURTHOUSE, STOCKTON, CALIF. San Joaquin Co. Courthouse, Stockton, Calif. BA 11/7. CD 10/10/61.

▲ **Kahala Hilton Hotel Corp.,** c/o Edmund Hastings, Hilton Hawaiian Village, Honolulu, Hawaii, Owner Builds, **$7,000,000**, 10 story Kahala Hilton HOTEL, 6.45 acres adjacent to Waialae County Club, Kahala District, HONOLULU, HAWAII. Killingsworth, Brady & Smith Assocs., 3833 Long Beach Rd., Long Beach, Calif., archts. Alfred Yee & Assocs., 914 Ala Moana Blvd., Honolulu, Hawaii, struct. engrs. Jaros Baum & Bolles, 415 Lexington Ave., New York 17, N. Y., mech. engrs. CD 8/21/61.

CANADA

BUILDINGS—BA

▲ **Man., Camp Shilo**—BA 11/28—Central Mortgage & Housing Corp., Montreal Rd., Ottawa, Ont., 198-unit low cost HOUSING, Canadian Military Camp. $2,500,000. Plans deposit $100. CD 9/18/61.

HEAVY CONSTRUCTION—LB & CA

▲ **Foundation Co. of Canada Ltd.,** 123 Eglinton Ave. E., Toronto, Ont., LB **$5,144,168**, approx. 2,800 lin. ft. SUBWAY STRUCTURE, various sections, misc. work, Toronto Bloor-Danforth University Subway (D-1) TORONTO, ONT. Toronto Transit Comn., 1900 Yonge St., Toronto, Ont. BA 11/6/61. CD 9/14/61;
C. A. Pitts General Contractor Ltd., 30 Commercial Rd., Leaside, Ont., LB **$2,388,322**, TUNNEL SECTION, incl. 2,250 lin. ft. 16 ft. tunnels and section Sherbourne St. Station (D-2) (Toronto, Ont.).

BUILDINGS—LB & CA

▲ **Edmonton Exhibition Assn. Ltd., Exhibition Grounds,** Edmonton, Alta., rejected bids opened June 30, 240 x 425 ft. SPORTS BLDG., EDMONTON, ALTA. LB **$2,916,775**. Project abandoned. CD 7/20/61, under LB.

▲ **Burns & Dutton Concrete & Constr. Co., Ltd.,** 1351 Vulcan Way, Richmond, B. C., CA **$2,623,000**, 5 story, L shaped, rein.-con. HOSPITAL ADDN., incl. 195 beds, ten operating rooms, diagnostic and treatment services, VICTORIA, B. C. Royal Jubilee Hospital, 1900 Peel St., Victoria, B. C. BA 10/6/61, CA 11/8/61. CD 10/23/61, under LB.

▲ **Robert McAlpine Ltd.,** 310 Victoria Ave., Westmount, Que., CA Est. **$20,000,000**, 9 story HOTEL, SHOPPING CENTER, CAR PARKING, Queen St. from Bank and Sparks Sts., OTTAWA, ONT. Owner, c/o Frank Ryan Radio Station CFRA, Ottawa, Ont. Peter Kickinson Assocs., 48 Rideau St., Ottawa, Ont., archts.

▲ **Yolles & Rotenberg Ltd.,** 111 Richmond St., Toronto, Ont., CA Est. **$3,000,000**, NEWSPAPER PLANT, OFFICE, Front St., TORONTO, ONT. Telegram Publishing Co., Ltd., 233 Bay St., Toronto, Ont. Webb & Menkes, 234 Bay St., Toronto, Ont., archts.

LATIN AMERICA

HEAVY CONSTRUCTION—LB & CA

▲ **HONDURAS**—Director General Hys., Office Ministry of Communications & P. Wks., Tegucigalpa, ROAD,
Morrison-Knudsen Co., Inc., 319 Broadway, Boise, Idaho, U. S. A., CA Sections 1 and 3, WESTERN HIGHWAY. BA 9/12. CD 7/21/61.

▲† **PANAMA**—Bureau P. Rds., Minister P. Wks., Panama City, ROAD,
Oman-Farnsworth-Wright, 625 Madison Ave., New York, N. Y., U.S.A., CA **$3,814,902**, Proj. 17-Sm. Section 6, hy. between La Concepcion and Costa Rica Border; Proj. 19-S, Section 4, hy. between Puerto Escondido and Guabala. BA 10/25. CD 11/3/61, under LB.

▲ **Thompson Cornwall,** 405 Lexington Ave., New York 17, N. Y., U. S. A., CA Aguaytia-Pucallpa section CENTRAL HY., LIMA, PERU. Ministry of Development & P. Wks., Lima, Peru. CD 5/12/61.

BUILDINGS—LB & CA

▲ **Constructora De Viviendas Familiares Sociedad Anonima (COVIFAM),** Buenos Aires, Argentina, subsidiary American International Housing Corp., 660 Madison Ave., New York 21, N. Y., U. S. A., CA Est. **$28,000,000**, design and construct 1, 2 and 3 story 4,000 unit LOW-INCOME HOUSING, Incl. RECREATIONAL and SHOPPING AREAS, Metropolitan Area, BUENOS AIRES, ARGENTINA. Ministry of P. Wks. & Services, Govt. Argentina, Buenos Aires, Argentina.

FOREIGN

HEAVY CONSTRUCTION—BA

▲ **West Pakistan**—BA 1/12—Project Director, Barrages, West Pakistan Water & Power Development Auth.,

(Continued on page 70)

CENTRILINE

grants NEW LIFE to old pipelines of 4" to 144" in diameter

HOW CENTRILINE HELPS • By giving a uniform cement-mortar lining to old pipes—**in place**—Centriline produces these benefits: • Stops corrosion and tuberculation permanently • Prevents all leakage • Permanently establishes highest hydraulic capacity.

SIX CENTRILINE ECONOMIES • By lining pipes in place you avoid expensive excavations • Old lines regain new carrying capacity • Pressure goes up, pumping costs go down • Pipe life is prolonged indefinitely • Centrilining saves time, because so much of the process is fast and automatic • New pipe, Centrilined **before** installation, prevents tuberculation, corrosion.

HOW CENTRILINE WORKS • After pipe is cleaned, machines apply cement-mortar to the inside walls. In larger pipe sizes, automatic trowels smooth lining to uniform thickness, determined by the speed of the machine. Centriline offers complete contract service.

PIPE RECONDITIONING FOR ALL SIZES

4"-14": Machine slides past corporation cocks and laterals without excavation. For small mains, fire lines, distribution grids. About 500 feet between openings.

16"-22": Self-propelled machine with automatic trowelling attachments. About 800 feet between openings.

24"-144": Operator drives machine through pipe. Lining trowelled to smooth finish. About 1200-1800 feet between openings.

For further information, send for our illustrated brochure.

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It moves

... powered and controlled by Westinghouse

Press a button—an indoor auditorium becomes an open air stadium in 2½ minutes—and behind that button is an unparalleled story of engineering and construction cooperation.

Architectural and engineering teamwork has given Pittsburgh the world's first movable roof auditorium. This versatile structure adds to the city's renaissance, in one building, a 14,000 seat sports arena, a convention hall, open air amphitheater, and an exhibit center. Westinghouse products bring the facilities to life, give precision control for the delicate manipulation of six 300-ton movable leaves.

Outwardly, the new auditorium is a 400′ stainless steel

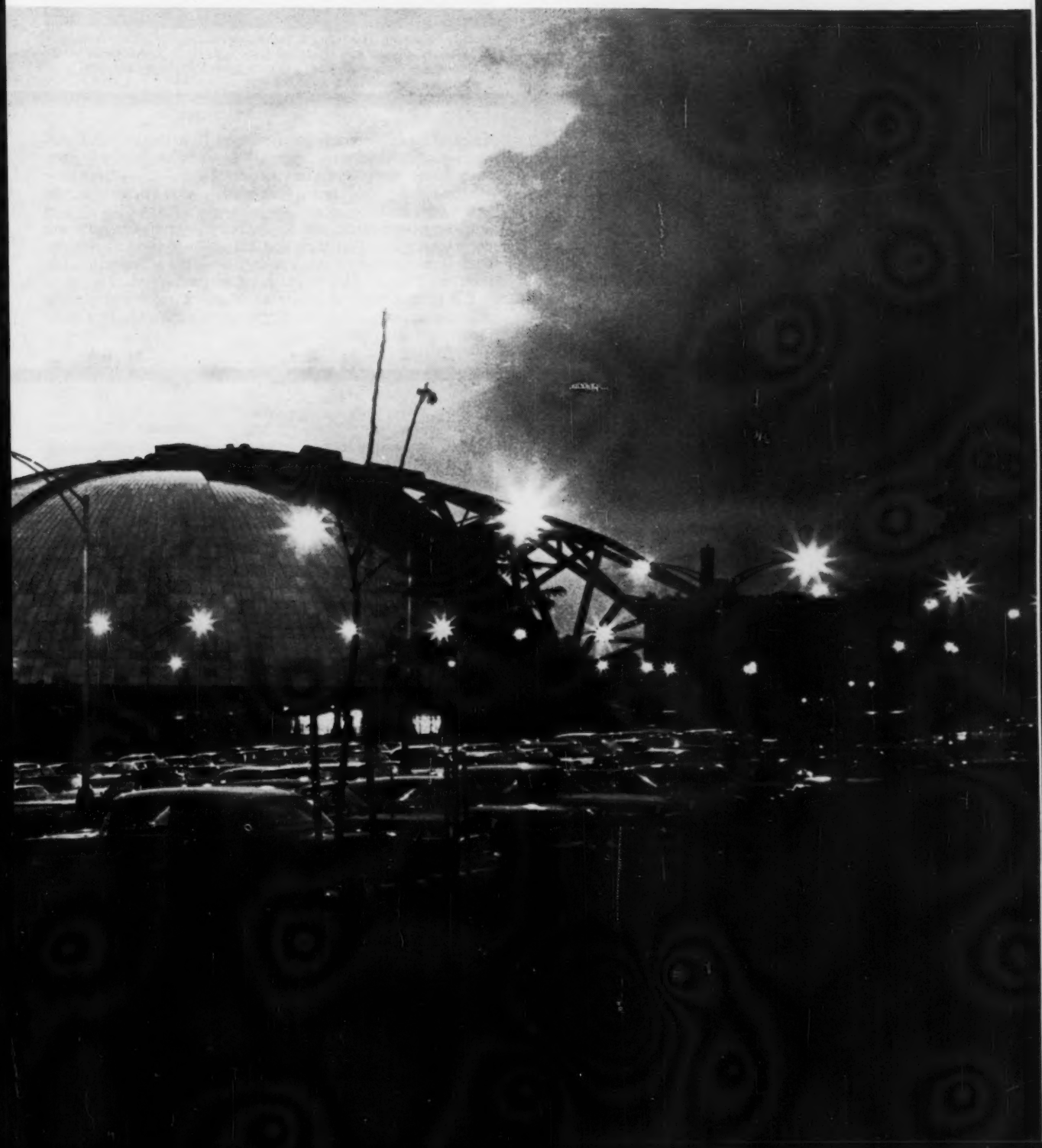
J-94176-1

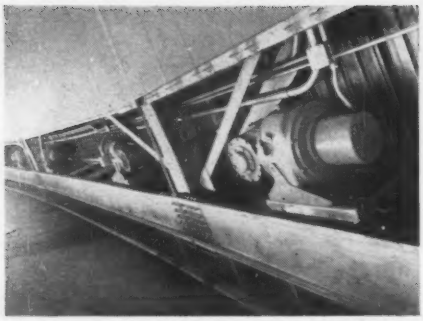
umbrella, suspended from a space frame cantilevered from the ground. That is one outstanding construction teamwork story.

Inside, coordination culminates in a control console located high above the seating area. From this station the

Construction Motivators: The Authority & Industry
l to r seated: Judge A. L. Wolk, Vice Chmn.; N. Stabile, Sec'ry Treas.; W. B. McFall, Chairman; H. R. Edelman, Jr., Pres. Heyl & Patterson; and D. J. McDonald, Vice Chmn.
standing: C. B. Jansen, Member; J. E. Payne, V. P. Westinghouse; and Edw. Fraher, Exec. Director

J-94176-2





The six movable roof leaves are driven by Westinghouse right angle gearmotors, five to each leaf. Photo shows base of one of the movable leaves with the acoustic ceiling panels removed.

O. M. Newman, Heyl & Patterson, and Edward Cohen, Ammann & Whitney, discuss roof electrical drive with C. G. Falkenstein, Westinghouse, kneeling in front of main roof reactor control cabinet.

unique movable roof drive system is activated. An AC reactor control scheme keeps all six movable leaves in step throughout open and close cycles. Each leaf is driven by Westinghouse Moduline® gearmotors, with opposite leaves being operated in pairs.

Close cooperation among architects, engineers, owner, contractors and Westinghouse helped to provide a system flexible enough to serve varying building demands, with the high degree of electrical reliability required.

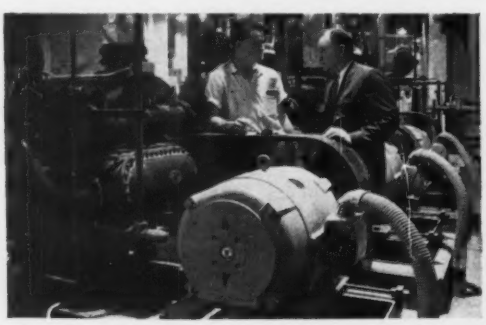
For more complete information on the electrical aspects of construction, write to: Westinghouse, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-94176-3

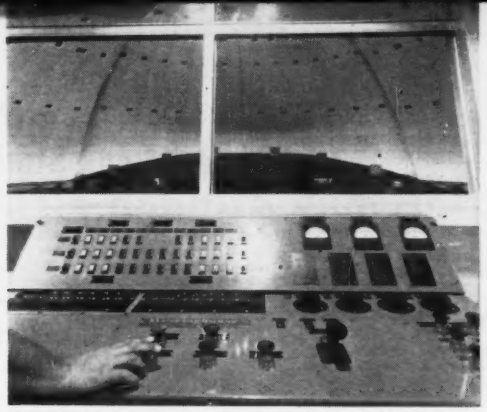
5KV metal-clad switchgear contains a tie-breaker to provide emergency switching between two incoming 4160-V lines. Seen here: N. J. Grady, V. P., Ernst, C. J. Long, and A. B. Janaszek.

Checking construction progress are C. J. Long and F. J. Sarknas, Westinghouse. In background, 1500 kva power center supplies power for building auxiliary and air conditioning compressor motors.

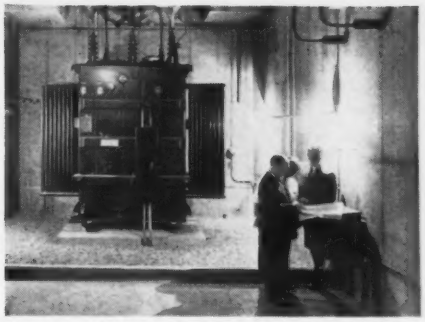
Westinghouse Motor Control Center located in the Mechanical Room centralizes auxiliary motor controls. Discussing installation advantages are H. R. Helvenston, C. J. Long and N. J. Grady.



Three 125 hp Lifeline A motors drive freon compressors to chill brine supply for ice rink piping. Seen here are P. F. Schad, Limbach, and C. G. Falkenstein, Westinghouse.



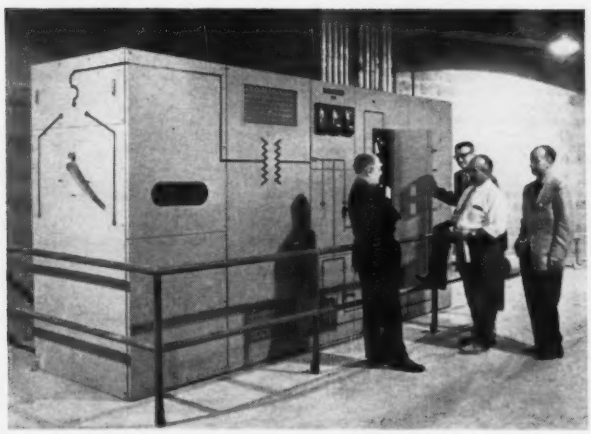
Operator's view from roof control console high above the spectator area. Visible through the glass front is the juncture of the first two movable leaves of the roof.



One of main power transformers rated 2500 kva at 11.6 kv to 4160 volts. Discussing the power supply are C. J. Long, Electrical Engineer, M. A. Geffel, Ernst, and A. B. Janaszek, Westinghouse.

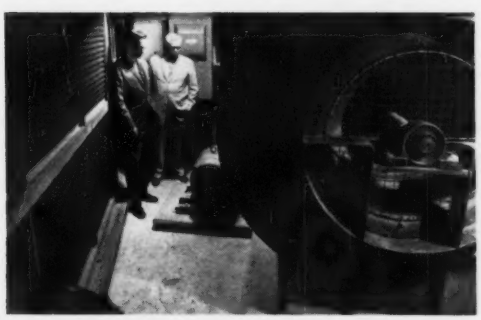
Builder: Public Auditorium Authority of Pittsburgh & Allegheny County: *Resident Engineer & Supt. of Construction:* H. Rey Helvenston
Architects: Mitchell & Ritchey, Pittsburgh
Roof Designers & Engineers: Ammann & Whitney, N.Y.
Electrical Engineer: Carl J. Long & Associates, Pittsburgh
Mechanical Engineer: John Mullin & Associates, Pittsburgh
General Contractor: Dick Corporation, Large, Pa.
Electrical Contractor: E. C. Ernst, Inc., Pittsburgh
Mechanical Contractor: Limbach Company, Pittsburgh
Drive System Contractor: Heyl & Patterson, Inc., Pittsburgh

Westinghouse



Another Westinghouse power center, this 300 kva ASL dry type supplies lighting and auxiliary power. Discussing its component parts are C. J. Long, A. B. Janaszek, M. A. Geffel and Albert Simon, Ernst.

Type M Electric Stairway transports 8,000 persons /hr. Top to bottom: E. R. Gallagher, supervising architect; H. R. Helvenston, resident engineer; and A. Simmonds, Westinghouse Elevator.



Fan room equipped with series 8000 Air-Foil centrifugal fan and air conditioning coils. W. Y. Humphreys, Westinghouse, with John Mullin, Consulting Engineer, air conditioning and ventilation system designer.

Westinghouse mercury vapor parking area and floodlighting are operated from this remote control panel located in the mechanical room. M. A. Geffel, Ernst, tests lighting circuits.

J-94176-4

(Continued from page 65)

Lahore, MAILSI SYPHON on Sutlej River to transfer water from Chinab River, via Sidhnai-Mailsi link canal through the Sutlej to the Bahawal link canal, Mailsi. CD 10/3/60.

HEAVY CONSTRUCTION—LB & CA

▲ **James Dredging Co.**, Southampton, England, CA $1,608,320, DREDGING MAIN CHANNEL, River Lee from Lower Harbor to Port of Cork to 18 ft. depth, CORK, EIRE. Cork Harbor Comn., Cork, Eire.

▲ The **Arabian-Italian Engrg. & Contg. Co. (Joint Venture of) Haji Abdullah Ali Reza Co., Saudi Arabia and Societa Italiana Lavori Maritimi**, Via Catania, Rome, Italy, CA $2,218,242, PORT EXPANSION, Yenbo, SAUDI ARABIA. Govt. Saudi Arabia, Riyadh, Saudi Arabia.

For additional reports see CONSTRUCTION DAILY REPORTS SECTION

PROPOSED PROJECTS

WATER SUPPLY

▲ **Minn., Crystal**—City, 6424 54 Ave. North, WATER SUPPLY. $5,000,000. Orr-Schelen, Inc., 1104 Currie Ave., Minneapolis, consult. engr. Bids 1963.

▲ **Pa., Phila.**—Dpt. Procurement, City Hall Annex, voted bonds Nov. 7,
Belmont WATER FILTER PLANT-REHABILITATION, $200,000.
Belmont RAW WATER STATION, rehabilitation, $115,000.
Torredale PRE-TREATMENT PLANT and rapid sand filters-expansion, $1,300,000.
City-wide FILTERED WATER STORAGE, $2,911,000.
City-WIDE REINFORCING WATER MAINS, $1,960,000.
City-wide WATER MAINS, $720,900.
Water mains, lines and facilities, Eastwick Proj., $604,000. Samuel S. Baxter, water comr. Bids early 1962. CD 10/27/61.

SEWERS, WASTE DISPOSAL

▲ **Ga., Decatur**—Bd. Comrs. DeKalb Co., DeKalb Bldg., INCINERATOR, $2,400,000, CD 5/28/59; SANITARY SEWER IMPRVS., $3,500,000. CD 8/5/57.

▲ **O., Cleveland**—City, City Hall, voted $6,000,000 bonds Nov. 7, SEWERS. CD 6/23/61.

▲ **O., Eastlake**—City, City Hall, voted $3,600,000 bonds Nov. 7, SEWERS. CD 7/12/61.

▲ **O., Elyria**—City, City Hall, defeated $3,100,000 bonds Nov. 7, SEWERS. CD 6/15/61.

▲ **O., Lakewood**—City, 12750 Detroit Ave., Zone 7, SEWAGE PLANT EXPANSION. $4,200,000. Frank L. Woodruff & Asscs., 3482 Lee Rd., Cleveland, Zone 20, engrs. CD 5/11/59.

▲ **O., Lorain**—City, City Hall, defeated $4,000,000 bonds Nov. 7, SEWERS. CD 7/12/61.

▲ **Pa., Phila.**—Dpt. Procurement, City Hall Annex, voted bonds Nov. 7,
reconstr. city-wide SEWERS, $4,000,000.
city-wide SEWERS to relieve unsanitary conditions and permit paving, $1,500,000.
SEWERS, $1,800,000.
Northeast SEWAGE TREATMENT EXPANSION, $2,323,000.
Southwest SEWAGE TREATMENT EXTENSION, incl. lagoons, pumping station, $380,000.
Lower Schuylkill west side INTERCEPTING SEWERAGE SYSTEM, imprvts., addns., $91,000.
Southeast SEWAGE TREATMENT IMPRVS., $100,000.
SEWERS, Eastwick Proj., $3,283,000. CD 10/27/61.

▲ **Va., Fairfax**—Bd. Supervs. Fairfax County, Fairfax, voted $10,000,000 bonds Nov. 7, SANITARY SEWERAGE SYSTEM EXPANSION. CD 8/3/61.

STREETS AND ROADS

▲ **Ga., Decatur**—Bd. Comrs. DeKalb Co., DeKalb Bldg., GRADING, PAVING, RESURFACING ROAD. $8,410,000. CD 8/8/57.

▲ **O., Cleveland**—City, City Hall, Zone 14, voted $4,000,000 bonds Nov. 7, PAVING. CD 6/23/61.

▲ **O., Youngstown**—City, City Hall, voted $9,000,000 bonds Nov. 7, HIGHWAYS. CD 9/19/61.

▲ **WASHINGTON**—State Hy. Comn., Transportation Bldg., Olympia, ROAD,
Cowlitz Co.—relocating Primary State Hy. NO. 5, Mossyrock to Kismoas, $6,800,000.

▲ **Wis., Milwaukee**—City, City Hall, PAVING 407 streets and alleys, 1962 program. $3,000,000. E. A. Schmidt, c/o owner, city engr.

EARTHWORK, WATERWAYS

▲ **Tex., Houston**—Harris County, Comrs. Court, Courthouse, voted bonds Oct. 21, OPEN and CLOSED FLOOD CONTROL DRAINAGE, $20,000,000. CD 8/3/56.

AIRPORTS

▲ **O., Cleveland**—City, City Hall, Zone 14, defeated $4,000,000 bonds Nov. 7, Cleveland Hopkins and Burke AIRPORT. CD 7/5/61.

UNCLASSIFIED

▲ **Ga., Decatur**—Bd. Comrs. DeKalb Co., DeKalb Bldg., PARKS. $2,600,000. CD 8/8/57.

▲ **O., Cleveland**—Bd. Comrs. Cuyahoga Co., County Admin. Bldg., 1219 Ontario St., Zone 13, defeated $2,500,000 bonds Nov. 7, ZOO. CD 7/28/61.

▲ **O., Cleveland**—City, City Hall, Zone 14, voted $3,000,000 bonds Nov. 7, RECREATION FACILITIES. CD 6/23/61.

▲ **Pa., Phila.**—Dpt. Procurement, City Hall Annex, voted bonds Nov. 7, PIERS 96, 98 and 100, South Wharves, rehabilitation, $500,000.
Marginal berthing FACILITY, Delaware River and Allegheny Ave., $4,000,000.
Marginal SHIP BERTHING FACILITY, multiple docking facilities, Delaware River near Packer Ave., $9,402,000.
Delaware River WATERFRONT DEVELOPMENT, bet. Race and Catherine Sts., piers, park area, recreational area, $1,500,000. Edward W. Lang, port engr. CD 10/27/61.

PUBLIC BUILDINGS

▲ **Calif., Huntington Beach**—Huntington Beach Union High School Dist., 1902 17 St., plans by Neptune & Thomas & Assoc., 1560 W. Colorado Blvd., Pasadena, 238,000 sq. ft. Huntington Beach HIGH SCHOOL NO. 3, Springdale and Edinger Sts. $4,000,000. CD 5/16/60.

▲ **Colo., Boulder**—University of Colorado Campus, (State Planning Comn., State Capitol, Denver) plans by Architectural Assocs., (Fisher & Davis, W. C. Muchow, Hobart D. Wagener & Ketchum Konkel & Hastings), 900 28th St., ENGINEERING SCIENCES CENTER, University of Colorado. $9,000,000.

▲ **Colo., Fort Collins**—School Dist. R-1, 317 S. College Ave., $3,200,000 bond election Dec. 12, SCHOOLS. William B. Robb, 156 S. College Ave., archt. CD 10/17/61.

▲ **La., Hammond**—State Hospital Bd., State Bond & Bldg. Comn., Baton Rouge, plans by Robert Coleman, 1038 Main St., Baton Rouge, RETARDED CENTER for Children, 100 acre site, near here. $3,000,000. Bids early 1962. CD 3/15/61.

▲ **La., New Orleans**—State Bond & Building Comn., Capitol Bldg., Baton Rouge, plans by Robert L. Stephen, 1218 Main St., Lafayette, LIBRARY for University of Louisiana at New Orleans. $2,500,000.

▲ **Mass., Fall River**—City, City Hall, plans by Strickland, Brigham & Eldridge, 209 Newbury St., Boston, CITY HALL. $3,000,000. Bids 1962. CD 9/29/60.

▲ **Mich., Taylor**—Taylor Twp. Bd. Educ., 13500 Pine St., Taylor, voted bonds Nov. 1, SCHOOLS. $7,387,000.

▲ **Mo., Champ (St. Louis 34 P.O.)**—Village, c/o 8801 Bangert Pl., $3,000,000 bond election Nov. 29, 1 story, 300,000 sq. ft. INDUSTRIAL PLANT. R. C. Can Co., 9430 Page Ave., Overland 14, Mo., lessee. Bids early 1962. CD 10/18/61.

▲ **N. J., Belleville**—Bd. Educ. Town of Belleville, High School, 183 Union Ave., referendum and project Dec. 21, HIGH SCHOOL, Passaic and Division Ave. $2,730,000. Alfonso Alvarez, 204 Bellevue Ave., Upper Montclair, archt. CD 10/20/61.

▲ **N. J., Edison**—Bd. Educ. Twp. Edison, Old Post Rd., Colton Ave., plans by Merchant, Siedel & Hickey, 1 Elm Row, New Brunswick, Edison HIGH SCHOOL ADDN., $1,980,000; Vogelback & Baumann, Rte. 22, Scotch Plains, N. J., consult. engrs., CD 10/19/60; plans by John MacWilliam, 495 Main St., Metuchen, HIGH SCHOOL off Grove Ave., $2,693,000, CD 10/19/60; plans by John MacWilliam, 495 Main St., Metuchen, ELEMENTARY SCHOOL, Clara Barton section off Grandview Ave., $540,000; plans by Nicholas Eckert, 17 Paterson St., New Brunswick, ELEMENTARY SCHOOL, Menlo Park section off Turner St., $554,000, Emil Spina Assoc., 100 Summit Ave., Summit, consult. engrs., Schwartz & Senes, 16 West Palisade Ave., Englewood, struc. engrs.; plans by Merchant, Siedel & Hickey, 1 Elm Row, New Brunswick, ELEMENTARY SCHOOL, adjacent to existing Lincoln School, $543,000, Vogelbach & Baumann, Rte. 22, Scotch Plains, consult. engrs.

▲ **N. J., Leesburg**—State Div. Purchase & Property, State House, Trenton, plans by Kelly & Gruzen, 10 Columbus Circle, New York 19, N. Y., MEDIUM SECURITY PRISON. $8,500,000. CD 8/6/53, under N. J., Arneytown.

▲ **N. Y., Bay Shore**—Bd. Educ. Bay Shore School Dist., 155 N. 3 Ave., $5,635,000 referendum Dec. 6, HIGH SCHOOL ADDN., ALTERATIONS; ELEMENTARY SCHOOL, Santa Maria site.

▲ **O., Akron**—Trustees, Akron Library Bd., 11 South Summit St., defeated $3,000,000 bonds Nov. 7, LIBRARY. CD 3/30/61.

▲ **O. Mansfield**—Bd. Comrs. Richland Co., Courthouse, defeated $3,750,000 bond Nov. 7, COURTHOUSE. CD 8/2/61.

▲ **Pa., Phila.**—Dpt. Procurement, City Hall Annex, voted bonds Nov. 7, MUNICIPAL SERVICES BLDG., $15,236,000. CD 10/27/61.

COMMERCIAL BUILDINGS

▲ **Hawaii, Honolulu**—Hilton Hotels & Charles Pietsch, Alexander Young Bldg., plans by Killingsworth, Brady & Smith Assocs., 3833 Long Beach Rd., Long Beach, Calif., 10 story 300-room Kahala Hilton HOTEL, to incl. large main pool First Step, DREDGING Ocean Beach, Kalaha. $7,000,000. Alfred Yee Assocs., 914 Ala Moana Blvd., consult. engrs. CD 8/21/61.

▲ **Hawaii, Honolulu**—Pacific Gardens, Rm. 301, Finance Factors Bldg., plans by Pacific Builders, 414 Ward Ave., 12 story APARTMENT, swimming pool, McNeill, Kahanu, Waiakamilo and Kaumualii Sts. $4,500,000. Bids July 1962.

▲ **Md., Bethesda**—Wall Lane, Inc., 7343 Wisconsin Ave., plans by Stanley T. Lewis, 1703 Rockville Pike, Rockville, OFFICE, Heights Plaza, Wisconsin Ave. and Wall Lane. $6,000,000. Constr. Spring 1962.

(Continued on page 76)

102 Buildings Studied

Hope-Witheron Building, San Diego
Towne House, Harrisburg, Pa.
Thomas Jefferson Bldg., St. Louis
Plaza Apartment Bldg. No. 10, St. Louis
Plaza Apartment Bldg. No. 20, St. Louis
Plaza Apartment Bldg. No. 30, St. Louis
Plaza Apartment Bldg. No. 40, St. Louis
Plaza Apartment Bldg. No. 50, St. Louis
Plaza Apartment Bldg. No. 60, St. Louis
1221 Minor Building, Seattle
Manhattan Bldg., Seattle
Logan Bldg., Seattle
Mark 51 Bldg., Seattle
Carlton House, Shaker Heights, Ohio
Broadway & Austin Bldg., San Antonio
215 N. Flores Bldg., San Antonio
Bayview Office Bldg. Addn., Ft. Lauderdale
Versailles Apartments, Ft. Lauderdale, Fla.
Birch Towers, Ft. Lauderdale
Breakwater Towers, Ft. Lauderdale
Massachusetts Blue Cross, Boston
Crimson Associates Bldg., Cambridge, Mass.
Babson Bldg., Boston
University Towers, New Haven
Woodland Medical Center, Hartford, Conn.
Strawberry Hill Terrace, Stamford, Conn.
1720 West End Bldg., Nashville
Park Towers, Baltimore
Hood-Hall Bldg., Dallas
Continental Apartments, Dallas
Empire Bldg., Salt Lake City
Dunleith Manor, Kansas City, Mo.
Quality Hill Towers Bldg., Kansas City, Mo.
Old Security Life Ins. Bldg., Kansas City, Mo.
Fidelity Bldg., Indianapolis
Grain Dealers Mutual Ins. Co., Indianapolis
St. Paul Fire & Marine Insurance Co., St. Paul
Cheeseman Towers Apartments, Denver
777 Grant Bldg., Denver
Bankers Union Life Bldg., Denver
1710 "H" Street, Washington
1901 Pennsylvania Ave., Washington
Mercury Bldg., Washington
Premier Bldg., Washington
R. C. A. Bldg., Washington
Bender Bldg., Washington
Potomac Towers, Arlington, Va.
3900 Watson Place, Bldg. A., Washington
3900 Watson Place, Bldg. B., Washington
Railway Labor Building, Washington
City Bldg., Washington
Whispering Waters, St. Petersburg, Fla.
Union Bank Bldg., Beverly Hills, Calif.
Independence Life Insurance Bldg., Pasadena
Cornelius Plaza, Portland, Ore.
Park Vista, Portland, Ore.
Bernard Horn Bldg., Cincinnati
2300 Luray Bldg., Cincinnati
Liberty Mutual Ins. Bldg., Boston
Cornet Bldg., Clayton, Mo.
Maylee Bldg., Cleveland Heights
National Cash Register Bldg., Cleveland
The Diplomat, Shaker Heights, Ohio
1674 Meridian Bldg., Miami Beach
1919 Bay Drive Bldg., Miami Beach
Southgate Towers, Miami Beach
Hartford Federal Savings & Loan, Hartford, Conn.
Gateway Center No. 4, Pittsburgh
Medical Center Office Bldg., Pittsburgh
Blue Cross Bldg., Dallas
Vaughn Bldg., Dallas
Presidential Apartments, Chicago
Calhoun Terrace Apartments, Minneapolis
Imperial Apartment Hotel, Denver
Park Adams, North Arlington, Va.
First Federal Savings & Loan, St. Petersburg
Western Geophysical Bldg., Los Angeles
Signal Oil Bldg., Los Angeles
California Bank Bldg., Los Angeles
Pacific Fidelity Life Insurance, Los Angeles
Ohio River Vista Apartments, Cincinnati
411 Oak Bldg., Cincinnati
Winebrenner Haven, Findlay, Ohio
College Terrace, Brooklyn
45 E. 72nd St., New York
Bankers Trust Bldg., New York City
201 E. 15th St., New York City
The Park East, New York City
IBM Bldg., Detroit
1st Ave. & 56th St., New York City
1733-49 E. 12th St., Brooklyn
Ocean Towers, Brooklyn
Ocean Terrace, Brooklyn
345 Webster Ave., Brooklyn
American Field Service Bldg., New York City
140 E. 44th St., New York City
165 E. 72nd St., New York City
Fieldstone Dale, New York City
Bolton Manor, New York City
300 E. 51st St., New York City
30 West Broadway, New York City
Administration Post Office Building, Detroit

National Study of 102 new Buildings reveals definite superiority of Structural Steel

Impartially selected, 44 of the studied buildings are framed in structural steel, 58 are reinforced with steel

Here are the results . . .

Speed— Buildings framed in structural steel went up 39.5% faster. From ground-breaking to occupancy, buildings framed in structural steel progressed at the rate of 116,200* cu. ft. per month, compared with 83,300* cu. ft. per month for structures reinforced with steel. (Structural steel's greater speed was substantial regardless of project size.)

Cost— Almost identical, regardless of framing material. Buildings framed in structural steel averaged $1.53 per cu. ft., compared with $1.50 per cu. ft. for buildings reinforced with steel, an apparent 2% premium for structural steel. However, steel-framed buildings were 95.4% air-conditioned, as against 79.6% for steel-reinforced buildings. With air conditioning amounting to an average of 6% of total building cost today, simple calculation reduces the differential to 1% which is more than offset by the revenue produced by 39.5% earlier occupancy of steel-framed structures. (Average annual rental rate for these buildings was $4 per sq. ft.)

Conclusions? Draw your own.

Study Specifications:

All building foundations were begun after Jan. 1, 1958. All buildings were occupied before Nov. 30, 1960. Buildings ranged in height from 4 to 21 stories. (59 from 4 to 9 stories and 43 from 10 to 21 stories.) Office and apartment buildings, selected at random and located in all parts of the country, were studied by impartial construction survey specialists. None of the projects involved abnormal delays beyond the control of the contractor.

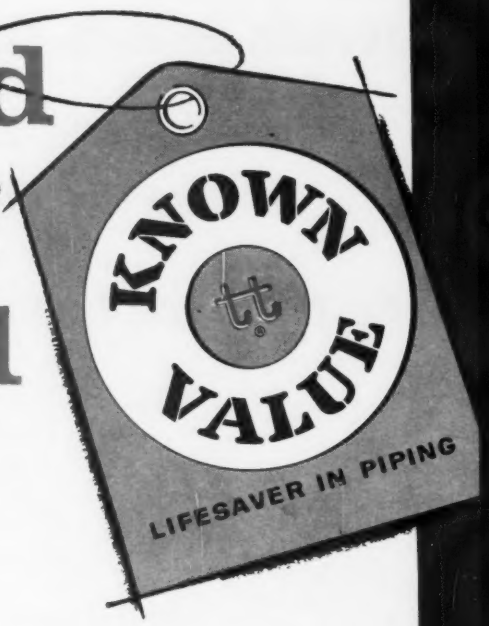
For more details on this study, write to American Bridge Division, U. S. Steel, Room 1801L, 525 William Penn Place, Pittsburgh 30, Pa.

*Applies to total construction time, not simply frame.

USS TRADEMARK

American Bridge Division of United States Steel

Be sure of this standard to be sure of the standard you specify



The TUBE-TURN trademark is more than a *trade* mark. It identifies a *standard* of performance and satisfaction. It has universal recognition and acceptance as a mark of *known* value.

TUBE-TURN components for welded piping systems are the product of decades of pioneering, of a wealth of experience without equal, of an investment in related research and engineering exceeding that made by all other such manufacturers *combined*. These are important considerations in this era of widespread deceit and subterfuge.

Simply copying TUBE-TURN products is an obviously easy shortcut to look-alike substitutes. When such impostors sneak into jobs through the "or equal" loophole in many specifications, however, it is impossible to be sure they meet TUBE-TURN standards. Only costly and time-consuming laboratory testing can prove it. And such testing, if undertaken, cannot be conclusive because the proper tests destroy the samples and there is never assurance of uniformity in any quantity delivered.

The substitution of *anything* for genuine TUBE-TURN welding fittings and flanges is difficult to understand or justify. TUBE-TURN quality demands no premium. TUBE-TURN products are always priced competitively with truly comparable items. Any so-called "bargain" substitutes *must* be substandard in value! What "saving" can possibly justify the risk involved when a single failure may easily result in losses greater than the cost of the entire piping installation?

Inferior Substitutes Can be Avoided!

Specifications calling for TUBE-TURN products with the customary "or equal" wording need not be the open door to risk or trouble. Responsible suppliers and contractors will not only serve you honestly and properly, they will be glad to provide proof of it. They will give you an affidavit that they have met your specifications to the letter . . . and they will identify and describe whatever substitutes they elected to supply within the "or equal" latitude allowed. This is a sensible procedure for everyone concerned. Write us today for a copy of Bulletin 1031-L-169 on this subject. TUBE TURNS, Louisville 1, Kentucky.

"TUBE-TURN" and "tt" Reg. U.S. Pat. Off.

TUBE TURNS

Division of CHEMETRON *Corporation*

KNOWN VALUE

LIFESAVER For The Men Who Design Piping

Tube Turns offers not only the most complete line of properly engineered welding fittings and flanges for utmost flexibility in planning any piping installation, but a wealth of technical data and able engineering assistance without counterpart anywhere in the world. Standardizing on TUBE-TURN piping components saves time and trouble.

KNOWN VALUE

LIFESAVER For The Men Who Buy Piping

The world's most complete line of welding fittings and flanges, over 12,000 regularly stocked TUBE-TURN items, permits every specification to be met without compromise or delay. A fully responsible Tube Turns Distributor is as near as your telephone to give prompt delivery of *all* your needs from *one* source on a *single* order. Saves time, paperwork, multiple checking, piecemeal deliveries and the inevitable problems of divided responsibility. You *save* money when you standardize on TUBE-TURN piping components!

KNOWN VALUE

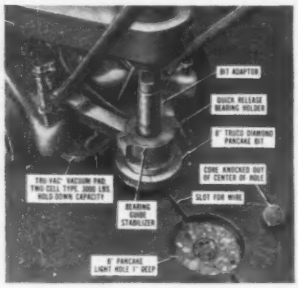
LIFESAVER For The Men Who Install Piping

Time is money in the assembly of a welding piping system. TUBE-TURN welding fittings and flanges do not require remanufacture or compromises . . . or the delays that result from rejections. They are uniform, precision-engineered for easy, time-saving installation. And you can put them in and *forget* them because they *are* dependable. TUBE-TURN piping components cost less because they save more in every way!

TUBE-TURN Welding Fittings And Flanges Are Stocked By And Sold Exclusively Through Authorized Distributors.

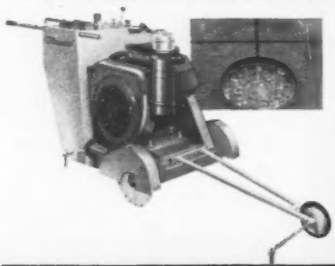
TRUCO DOES IT AGAIN!

8 out of 12 Airport Pancake Lighting Jobs are Done with This Truco Equipment


BIT ADAPTER
QUICK RELEASE BEARING HOLDER
6" TRUCO DIAMOND PANCAKE BIT
CORE KNOCKED OUT OF CENTER OF HOLE
SLOT FOR WIRE
BEARING GUIDE STABILIZER
TRU-VAC VACUUM PAD TWO CELL TYPE, 3000 LBS. HOLD DOWN CAPACITY
6" PANCAKE LIGHT HOLE 1" DEEP

TRUCO MODEL G-2A
Diamond Drilling Machine with Tru-Vac Vacuum Pad

Can pay for itself on a single job because of easy mobility, quick set-up, high speed drilling and instant release. Self-contained. Only rig you can wheel off and on runway in seconds and use with only a water-line connection to tank truck. Rigid set-up through vacuum up to 3000 lbs. Instant release. Special pancake drills for high-speed drilling.



TRUCO MODEL TCWD 36
Self-propelled, Concrete Saw with Truco Diamond Blades

For runway centerline or narrow gauge lighting. Fast, perfect straight line cutting; stays in cut without jamming or climbing. Truco Diamond Blades, product of 50 years of specialization, give exceptional cutting mileage and economy. Write for literature.

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MASONRY DRILLING DIVISION
Wheel Trueing Tool Company
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WORLD'S LEADING MANUFACTURER OF ADVANCED DESIGN PNEUMATIC PLACING EQUIPMENT

WHEN PLACING CONCRETE

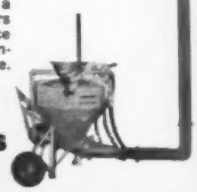
GET RIGHT TO THE POINT!

with the

AIRPLACO® "AIR EXTRUSION METHOD"

Users of AIRPLACO Concrete Placers tell us that this versatile piece of equipment can make the difference between profit or loss on many jobs. Distributing structural concrete to difficult pours, for tunnel lining, pressure grouting, blowing sand or pea gravel backfill, or a host of other jobs, the AIRPLACO Concrete Placer does it faster, easier, with higher production rates for more profit.

JUST LET US KNOW when you have a concrete problem. Our Field Engineers can draw upon many years of experience on many jobs to help you cut your concrete costs. Just write, wire or phone. Obligation? Of course not!



AIRPLACO
CONCRETE PLACERS
MEAN LOWER COST CONCRETE

Concrete Placers

Concrete Guns – Wet or Dry

Mix Elvators

Wet Gun & Grout Pump

Mud Jacks

AIRPLACO AIR PLACEMENT EQUIPMENT CO.
1008 WEST 25TH ST. • KANSAS CITY 8, MO.

(Continued from page 70)

▲ **Md., Wheaton**—Wheaton Plaza Regional Shopping Center, Inc., plans by Edmund W. Dreyfuss, 1019 15 St. N.W., Wash., D. C., 10 story OFFICE. **$3,000,000.** Bids February 1962.

▲ **Mich., Detroit**—Downtown Investment Co., Wm. Gershensen & Assocs., 1010 Washington Blvd., Zone 26, plans by King & Lewis, Inc., 15790 Wyoming Ave., Zone 38 and Curtis & Davis, 331 Madison Ave., New York, N. Y., 25 story HOTEL and 200-car underground PARKING GARAGE. **$10,000,000-$12,000,000.** Syska & Hennessey, Inc., 144 E. 39 St., New York 16, N. Y., consult. engr. Raymond C. Reese Assocs., 300 Sandusky St., Toledo, O., struct. engrs. CD 6/19/61.

▲ **Mich., Detroit**—Max Osnos & Assocs., 1056 Randolph, Zone 26, plans by Wah Yee, 15575 Jas. Couzens Hy., Zone 38, MOTEL-RESTAURANT, Woodward and Stimson Aves. **$2,500,000.** CD 11/6/61.

▲ **Mich., Rochester**—Crittenton General Hospital, 1554 Tuxedo, Detroit, plans by Smith, Hinchmann & Grylls Assoc., Inc., 3107 W. Grand Blvd., Detroit, 200-bed HOSPITAL. **$5,000,000.** CD 1/25/61.

▲ **Mich., Southfield**—Northway Development Co., Rodney Lockwood & Co., 2031 First National Bank Bldg., Detroit, Zone 26, SHOPPING CENTER and 1,650 car-parking, Southfield Rd. between 12 and 13 Mile Rds. **$2,500,000.**

▲ **Mo., St. Louis**—Siteman Organization, 7745 Carondelet Ave., Clayton, Zone 5, plans by Hellmuth, Obata & Kassabaum, Inc., 315 N. 10 St., Zone 1, 25 story OFFICE, 300-car GARAGE, landscape plaza, 12th Blvd. and Olive St. **$10,000,000.** Bids Fall 1962.

▲ **N. J., Little Ferry**—Tamburelli Constr. Co., 574 Grand Ave., Englewood, plans by George M. Vuinovich, 624 East Palisade Ave., Englewood Cliffs, SHOPPING CENTER, off Bergen Turnpike. **$4,000,000.** CD 10/10/61.

▲ **N. Y., Bayside**—Lewis B. Carr, 22 W. 48 St., New York, Zone 20, plans by Alexander Danin, 19-01 Bell Blvd., sixteen 6 story, 62 units each, APARTMENTS, 210 St., 23 Ave., Corporal Kennedy St. and 207 St. **$9,600,000.** Constr. late 1962.

▲ **N. Y., Jackson Heights**—Harry Match, 919 Harvard Court, Woodmere, plans by M. Rothstein & Son, 186 Joralemon St., Brooklyn, Zone 1, four 5 story 180 x 261 ft. with 128-units APARTMENTS, 75 St. and 30 Ave. **$4,320,000.**

▲ **N. Y., New York**—Grove Holding Corp., 16 Court St., Brooklyn, Zone 1, plans by Philip Birnbaum, 12 E. 48 St., Zone 17, 13 story, 189 unit 70 x 145 ft. APARTMENT, 208-218 East 15 St. **$3,500,000.** Robt. Rosenwasser, 375 5 Ave., Zone 16, struct. engr. Bardos & Ettinger, 118 E. 28 St., Zone 16, mech. engrs. CD 4/28/61.

▲ **N. Y., New York**—357 E. 71 Corp., c/o Philip Birnbaum, archt., 12 E. 48 St., Zone 17, 20 story APARTMENT, 360 E. 72 St. southwest corner First Ave. **$4,000,000.** Robt. Rosenwasser, 375 5 Ave., Zone 16, struct. engr. Bardos & Ettinger, 118 E. 28 St., Zone 16, mech. engr. CD 8/25/58.

▲ **O., Columbus**—Paul J. Decker, 2121 Riverside Dr., 535 HOMES, on 485 acres, Olentangy Country Club Estates, **$20,000,000-$30,000,000,** Marion Packard, 2741 Fairfax Dr., landscape archt., designer of subdivision; WATER, SEWAGE PLANT, **$2,000,000,** Burgess & Niple, 2015 W. 5th Ave., Columbus, consult. engrs.

▲ **O., Grove City**—William H. Davis & Son, Inc., 22 Winner Ave., Columbus, SHOPPING CENTER, 165 HOMES subdivision, 160-unit APARTMENT, Grove City Center, **$8,000,000.** Bids in Spring 1962.

▲ **O., Strongsville**—Strongsville Community Hospital, c/o Dr. Peter Gulmi, 3104 W. 25th St., Cleveland, Zone 9, 100-bed HOSPITAL, 100-bed NURSING HOME, CLINIC, NURSES HOME. West Side Pearl Rd., south of Royalton Rd. **$4,500,000.**

▲ **Tex., Dallas**—Winthrop Rockefeller, c/o Boyd Ridgway & Associates, Grand Prairie, 1 story, 300,000 sq. ft., masonry SHOPPING CENTER, **$3,500,000;** 150 unit family APARTMENT units, out of Dallas at Jefferson St., U. S. Hy. 80 and Cartier Parkway, **$1,000,000.** Bids early 1962.

▲ **Tex., Houston**—Owner c/o Dempsey J. Prappas, 1220 Polk Ave., two 24 story APARTMENTS, underground parking, swimming pool, 1½ mi. 5 acre tract 7200 Blk. Main St. **$14,000,000.**

INDUSTRIAL BUILDINGS

▲ **Tex., Baytown** — Marbon Chemical Division, Borg-Warner Corp., 200 S. Michigan Ave., Chicago, Ill., 75,000,000 lbs. per year STYRENE MONOMER PLANT.

AMERICANS ABROAD

▲ **Trinidad, Port of Spain**—Govt. Trinidad, modern SEWERAGE SYS. on Island of Trinidad. **$18,100,000.** Metcalf & Eddy, Ltd., 1300 Statler Bldg., Boston, Mass., U.S.A., consult. engrs.

FOREIGN

▲ **FEDERATION OF MALAYA**—Govt., Federation of Malaya, Kuala Lumpur, ROAD, highway along route Bukit Mertajam, Province Wellesley-Grik, Perkak-Kuala Krai, Kellantan. **$12,500,000.**

▲ **India, Madras** — Sha Manakchand Shadiram, 32/33 Sembudoss St., Madras 1, Madras State, PLANT for manufacture of welded steel tubes. **$5,000,000.**

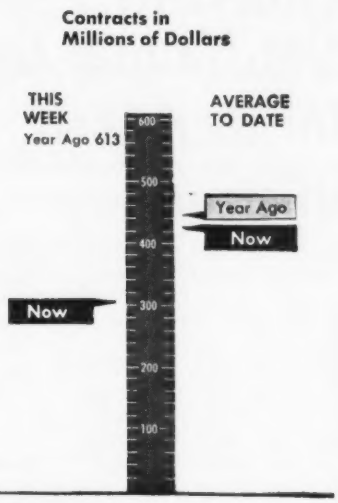
▲ **Israel**—Govt. of Israel, Jerusalem, ROADS, improving inter-urban highways, conversion of Tel Aviv-Haifa road into four lane hy., wid'n. road from Tel Aviv to Jerusalem and new roads. **$59,360,000.**

For additional reports see CONSTRUCTION DAILY NEWSLETTER

(Proposal Advertisements see pp. 80 to 82)

Construction Scoreboard

This Week . . .



AMOUNT OF CONTRACTS LET

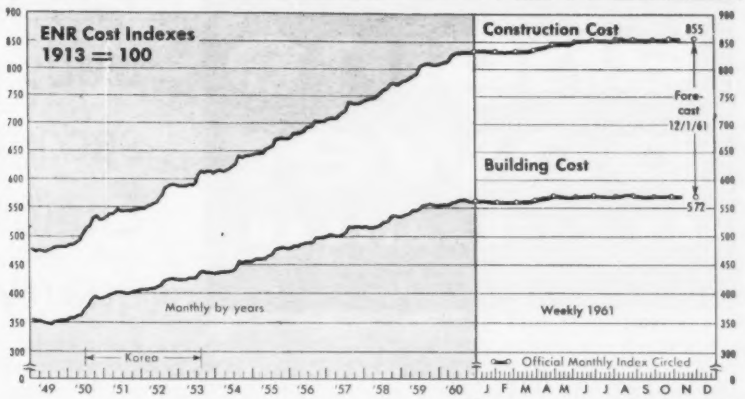
Contracts Awarded In 50 States By Type	This Week millions	Cum. 47 wks 1961	Chge '60-'61 %
All Heavy Construction	$304.8	$20,179.9	− 3
By Ownership			
PRIVATE	149.0	9,999.7	−10
PUBLIC	155.8	10,180.2	+ 5
State & Municipal	138.1	8,038.6	+ 6
Federal	17.7	2,141.6	− 1
By Type of Work			
PUBLIC			
Waterworks	11.4	373.0	−12
Sewerage	9.1	743.4	+36
Bridges*	8.0	600.5	−19
Highways	49.1	3,421.0	+10
Earthwork, Dams & Waterways	9.6	738.7	+ 5
Buildings:			
Excl. Housing	47.2	2,391.5	+ 5
Housing	15.1	754.8	+18
Unclassified	6.7	1,158.4	−10
PRIVATE			
Buildings:			
Mass Housing	65.8	4,675.4	−10
Commercial	39.3	2,344.2	+0.4
Industrial	36.4	2,571.3	−0.1
Unclassified	7.1	407.7	−58

*Includes Private bridges

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

NEW CONSTRUCTION CAPITAL

	Week of Nov. 16 millions	Cum. 46 wks 1961	Chge '60-'61 %
Corporate Securities	$ 38.4	$3,166.0	− 6
State & Municipal:			
All Except Housing	190.8	6,058.5	+ 5
Housing	4.8	126.6	−36
Federal Loans	0	227.1	+33
Federal Aid	0	3,535.6	+10
Total Nonfederal	$234.0	$13,113.8	+ 3
Federal Appropriations:			
Projects in U. S.	0	3,448.1	+ 9
Outside U. S.	0	145.4	− 9
Total New Capital	$234.0	$16,707.3	+ 4


ENR Cost Indexes
1913 = 100
Construction Cost
855
Fore-cast 12/1/61
Building Cost
572
Monthly by years
Weekly 1961
Korea
Official Monthly Index Circled
'49 '50 '51 '52 '53 '54 '55 '56 '57 '58 '59 '60 J F M A M J J A S O N D

ENR INDEXES (1913 = 100), 20-cities' average	Week of Nov. 16 1961	% Change from Oct. 19 1961	% Change from Nov. 17 1960
Construction Cost	855.10	+0.2	+3.0
Building Cost	570.52	+0.1	+1.7

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

MATERIALS SHIPMENTS

	1961 Sept. (S) Aug. (A)	Cum. (No. of Mos.)	% Chg. from Year Ago Mo.	Cum.
Portland Cement, Bur. Mines, thous bbls	33,204(S)	242,043(9)	− 1	+ 1
Concrete Paving Awards, PCA, thous sq yd	6,929(S)	82,993(9)	− 7	+ 4
Fabricated Structural Steel, thous tons	326(S)	2,832(9)	−10	− 3
Bookings, AISC, thous tons	408(S)	3,108(9)	+40	+10
Reinforcing Bars, Net, AISI, thous tons	228(S)	1,864(9)	+ 9	+12
Lumber, total NLMA, mil fbm	2,784(S)	23,833(9)	− 3	−12
Production, total, mil fbm	2,829(S)	24,103(9)	− 5	−11
Orders, total, mil fbm	2,724(S)	24,595(9)	− 2	− 4
Douglas Fir, mil fbm	583(S)	5,835(9)	−12	− 4
Southern Pine, mil fbm	578(S)	5,045(9)	+ 9	+ 1
Unfilled Orders, Douglas Fir, mil fbm	424(S)*	485(9)*	− 4	−19*
Southern Pine, mil fbm	221(S)	263(9)*	+27	+32*
Clay Products, Bureau of Census				
Brick, Unglazed, Common, Face, mil bri	665p(A)	4,221p(8)	−0.2	− 4
Vitrified Clay Sewer Pipe, thous tons	181p(A)	1,167p(8)	− 9	− 7
Structural Tile, Unglazed, thous tons	38p(A)	293p(8)	−14	−12
Asphalt Products, Bureau of Census				
Asphalt Roofing, thous sales sqs	6,880p(A)	38,602p(8)	+ 1	+ 1
Asphalt Siding, thous sales sqs	89p(A)	520p(8)	+ 6	+ 1
Aluminum, Wrought, Net, Bur Census				
Sheet and plate (non-heat treatable), mil lbs	113p(A)	839p(8)	+10	−0.2
Wire and Cable, mil lbs	35p(A)	231p(8)	+25	+13
Extruded Shapes (soft alloys), mil lbs	80p(A)	569p(8)	+12	+ 4

EMPLOYMENT AND FAILURES

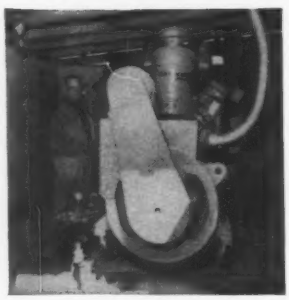
Contract Const Employment, BLS, thous	3,046p(S)	2,751p(9)*	− 4	− 4*
Contractor Failures, Dun & Bradstreet				
Number	183(S)	2,111(9)	−16	+11
Liabilities, thous	$10,048(S)	$142,796(9)	−30	+ 3

* Average per month p=preliminary figures

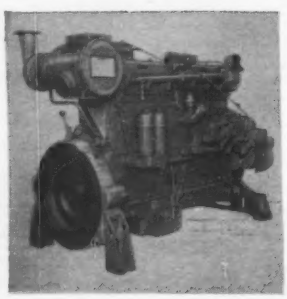
engine power BY CATERPILLAR

75% cut in fuel costs leads to purchase of second Cat Natural Gas Engine for increased quarry efficiency

The McClinton Bros. Limestone Quarry is located at Johnson, Arkansas, five miles north of Fayetteville. Products are dry white limestone, cement, asphalt and concrete mix, cement blocks, and aggregates. Caterpillar Engines have played a large part in increasing quarry efficiency.



Owner Clark C. McClinton beside the Cat G375 which furnishes power to drive the quarry's motors. His experience with this engine led him to the purchase of a second, the G342, for the impact breaker.



The new Cat G342 supplies power for an impact breaker. It replaced an electric motor and has proved to be more economical and more efficient for this operation.

Clark C. McClinton bought his first Caterpillar Diesel over 14 years ago. When he was ready with a modernization plan for his quarry at Fayetteville, Arkansas, he purchased a Cat G375 Natural Gas Electric Set for prime power. The result: 75% savings in fuel costs and maintenance outlays. In another step of his plan: an engine to power an impact breaker, Mr. McClinton did not have to make a choice. It had already been made for him by his experience with Caterpillar Engines, particularly the G375. "The fuel economy and low initial cost per horsepower convinced us that another Cat Natural Gas Engine would be a worthwhile addition to our quarry." In addition to replacing an electric motor for powering the impact breaker, the Cat G342 also eliminated the need for a transmission to vary the speed required for stone fineness.

The reason you get such dependability from Cat Natural Gas Engines is that they are built essentially as diesels—only the pistons and fuel systems have been changed for natural gas operation. This built-in diesel strength allows high compression ratios for high horsepower output and superior fuel economy. For the full story, see your Caterpillar Dealer. He can show you dramatic proof of the superiority of Caterpillar Natural Gas Engines. He's listed in the Yellow Pages. Or write Engine Division, Caterpillar Tractor Co., Peoria, Illinois.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Engine Division, Caterpillar Tractor Co., Peoria, Ill.

Big Contracts for 'Small Business' Hurt

- **Contractor groups cry "foul" as set-asides grow in size, number and frequency.**
- **Labor groups also complain that program aids nonunion contractors who "cut corners."**

The controversy over small business set-asides on government construction contract awards flares hot once again (ENR Dec. 1 '60 p. 29). The latest episodes:

• The Army Corps of Engineers will shortly let a contract for construction of the Proctor Dam and Reservoir in Texas. Bids were opened October 31. Although the Corps estimated cost of the project at $5.5 million, it limited competition to small-business contractors. The low bid came in at $5.7 million. The small-business designation drew protests, but they are not expected to block award of the contract. Interestingly enough, when a $1-million phase of this project was set aside for small business, the complaints that followed resulted in the Corps' stripping the project of its set-aside label (ENR Dec. 8, 1960, p. 26).

• Invitations to bid went out this month for $4.7 million worth of construction at the Army Ballistic Missile Agency, Huntsville, Ala., and for a $2-million project at the Minuteman ICBM installation at Ellsworth Air Force Base, S. D. In both cases, the invitations restricted bidding to small-business construction firms. The bids on both projects will be opened in December.

At issue in the squabble is the Small Business Administration's insistence—backed by a 1958 law—that government construction work be set aside for small firms wherever practicable. SBA defines a small construction company as one that averaged no more than $5 million worth of business per year in the preceding three years.

The Associated General Contractors has unsuccessfully opposed the set-aside program on the grounds that it interferes with competitive bidding, boosts government construction costs, and may place construction projects in the hands of technically unqualified contractors.

AGC objects particularly to the large size of some of the projects reserved for the small firms. In some instances, cost of the projects has been close to, or exceeded, the $5-million annual level of work that SBA uses to define small business. The association believes that if there is to be a small business set-aside program, a considerably smaller volume should be used as the standard.

Queried by ENR about the pending Army contract awards, D. A. Dunn, small business specialist in the Office of the Chief of Engineers, said that "the dollar value does not enter into the criteria for small business set-asides."

He said the set-asides are made "where there is a reasonable expectation that a sufficient number of bids will be received from qualified small firms so that awards will be made at a reasonable price. It would be silly, of course, if we tried to set aside projects as large as $40 million, because it would be unlikely that a small company would qualify."

Another problem exists. Because so much of the military construction dollar goes for complex missile jobs for which small contractors can't qualify, the military agencies "look real hard" for all other types of work suitable for small business, says John Heard, director for construction in the office of the Secretary of Defense.

A Pentagon construction planning official told ENR that some defense officials have "resisted the set-asides." He said, "We would like to keep the bidding as open as possible because the set-aside practice poses penalties for us."

But this type of criticism flies in the face of the Kennedy Administration's increased emphasis on channeling as many defense orders as possible to smaller firms. During the first six months of 1961, for instance, the volume of government contracting to small business increased 69% over the same period in the previous year.

Says SBA: "The set-aside program has worked smoothly in the fields of equipment, supplies, and services. There is no reason why it should not work in a like manner on construction.

"The question of excessive costs resulting from set-asides on equipment, supplies, and services has seldom been raised.

"We have no reports on construction contracts being awarded at unreasonable prices. We have no reports on poor workmanship by contractors receiving construction contracts as a result of set-aside procurements.

"Objections to the program have been coming from a few large contractors and from officers and directors—not rank-and-file members—of various branches of AGC. We have in the files comments from several small companies that indicate that the program is one of definite benefit to small contractors."

Privately, agency officials concede that the lowest price does not enter into the set-aside policy. Their stress is on "reasonable prices." Says a Pentagon small business official: "Our interest is that small business gets a chance to become big business rather than stay stagnant."

Opposition to the set-aside policy comes from some of the building trades unions. Paul Eskew, assistant to the president of the International Union of Operating Engineers, complains that the program aids small, non-union contractors who "have to cut corners." He charges that in certain cases construction awards have been held up while contracting officers sought bids from small firms.

Mr. Eskew also fears the small business definition for the construction industry may be boosted from the $5-million standard to $10 million.

Rep. Phil Weaver (R., Neb.) is another critic of the set-aside program. His office cites a case in Lincoln, Neb., where a contract has been awarded to one small contractor who bid over the Corps of Engineers cost estimate and withheld from another small firm that under-bid the official estimate because a multi-millionaire was a large investor in the second company.

The case involves the $431,000 Antelope Creek Dam project. The Stewart Construction Co., which the congressman's office describes as "very small," came in with a $399,000 bid. SBA challenged Stewart's status as "small business," according to the congressman's office, because George P. Abel, described as a "multi-millionaire," was an investor in the company. The contract went to Armstrong Co., Inc., Ames, Iowa, which bid $465,000.

The Stewart company has presented an appeal to SBA's Size Standard Appeals Board.

Cost of High Living Abroad

With U.S. contractors building in far away places, an increasing number of Americans are becoming as concerned with the cost of a plate of sukiyaki or a midnight cruise on the canals of Venice as they are with buying steel or cement. As an aid in predicting expenses abroad, the McGraw-Hill Economics Department has quizzed correspondents and come up with a Cost of Living It Up Index.

While a night on the town for two—from shoeshine to the taxi home—in New York City runs $88, the cost is less than half this in many parts of the U.S. The national average is $67, roughly the same as South America.

One of the least expensive of the 16 countries surveyed is Canada, where a complete evening's activities costs $44. The European figure approaches $50 and is just under the price of living like an imperialist in Russia.

McGraw-Hill's man in the Soviet Union points out, however, that one usually gets what one pays for there. For example, haircuts are bargain-priced at 30 cents, but the effect is similar to stumbling in front of a lawnmower.

Comparisons are difficult and often don't bear out expectations. Dinner and drinks, accompanied by a show, at Paris' famed Lido cost a modest $20, which would hardly stand one person to soup and crackers at New York's swank Four Seasons restaurant.

Some expenditures are unique to certain parts of the globe. The visitor to Russia who allows vodka to get the best of him can find solace in a sobering-up station at a charge of $4.45.

The most luxurious hotel in Caracas is several dollars cheaper than first-class accommodations since fierce competition has drawn off its business.

And in Bombay, where a good meal may be had for $3, drinking is another matter. Prohibition makes a local custom of taking moonshine martinis from an inner tube, but a visitor secures the privilege of paying $2 for a bona fide mixed drink by laying out $3 for a tourist drinking permit.

In Buenos Aires it's also possible to pay $2 for a drink, but without having to buy a license. Otherwise alcohol is nearly equal in price throughout the world—except in Australia where a whiskey and soda is about 35 cents. Not so with food which varies with the local living standard. A complete dinner may cost anywhere from $3 to $12.

The most variable item on the traveling night owl's expense account is entertainment. A choice seat for a bull fight in Caracas costs $25 while a spot in the third row center of a Belgrade theater is 75 cents, and in Athens $1.25. The unsuspecting executive will find his night club tab in Beirut in the neighborhood of $26 and in Hong Kong, $14.

Apart from such radical differences, however, entertainment around the world is generally just slightly lower than the U.S. average of $10 to $12.

Private transportation is the only expense abroad that consistently exceeds the toll in this country. In Western Europe taxis cost as much as $3 for a 15 minute ride. And in Argentina it is necessary to engage a cab for the evening at about $17 plus 17 cents per mile. As with many items, Hong Kong offers the most economical taxis—$2.10 per hour regardless of distance.

The man who takes his family on a foreign assignment has some additional worries. In Russia reasonable rates for hotel rooms are quoted only for those actually engaged in business ventures; for the wife and children, charges run to Waldorf-Astoria proportions.

Anyone who intends to tow the family through Asia or Latin America might be advised to bring a mother-in-law along as well, since baby sitters are not available and residents depend upon relatives and friends for this service.

From this two-year study, McGraw-Hill economists draw a dismal conclusion: Like the high cost of living, the cost of high living everywhere is on the rise.

September Sag

New orders for equipment decline 5% from August

New orders for construction machinery lagged in September. In the same month, heavy construction contracts slowed, but this volume rebounded sharply in October coming close to matching the all-time October high established in 1956.

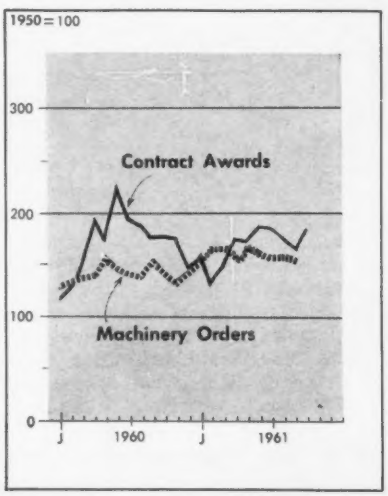
New orders for construction equipment dropped below the year-earlier volume, the first such drop in 14 months.

The index value slipped to 151 in September from August's reading of 159 (revised upward from 158). The September value was 5% below both September 1960 and August 1961. The McGraw-Hill Economics Department computes the new orders index from reports by cooperating manufacturers. It is based on 1950 as 100.

Construction machinery orders, however, rose faster this year than orders for machinery placed by U.S. industry as a whole.

For the nine-month period ending September 30, new orders for construction machinery were up 9% from 1960's same period, according to the McGraw-Hill Economics Department's index. Dollar value of all machinery and equipment orders went up about 3%, according to U.S. Commerce Department information. This puts orders for all machinery at a new peak.

The Contract Award Index jumped to 182 in October, based on the weekly average of heavy construction contracts reported by ENR. The October value came close to June's high for the year of 186, and topped a year earlier by 4%. This index is also based on the year 1950 as 100.

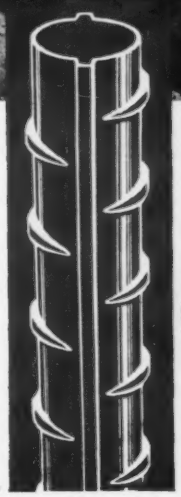


Travel any route

There is a reason for all of those reinforced Concrete Bridges

224 Ft reinforced concrete overpass carrying the Dalles-California highway, Route U.S. 97, over Southern Pacific Railroad, Klamath Falls, Oregon

Designers: State of Oregon Highway Department
Contractor: Peter Kiewit Sons' Co., Vancouver, Washington



It's cost! When compared to other materials, the cost of a reinforced concrete structure is usually less. From such savings, highway engineers are able to extend their highway budgets for more construction improvements. Construction *time* is reduced, too. Projects, large or small, start on time and finish on schedule without delays created by material shortages or field design changes. Put all of these advantages to work for you. Design your next project for reinforced concrete.

Concrete Reinforcing Steel Institute
38 South Dearborn Street, Chicago 3, Illinois

11-61

Reuther Seeks Building Trades Curbs

- **Industrial unions ask building trades to end their maintenance by contract and to arbitrate disputes.**
- **The internal union conflict will be aired on AFL-CIO convention floor but is not likely to kill the merger.**

After six years of abortive negotiations, the rival craft and industrial union divisions of the AFL-CIO are bringing their fight into the open. The showdown will come early next month at the Federation's biennial convention in Miami Beach.

The decision to bring the conflict to a head—which ranges over such issues as job jurisdiction, boycotts of rival union products, and membership discrimination—actually was made by Walter Reuther and other leaders of the AFL-CIO's industrial unions. It was quickly picked up by Building Trades Department President C. J. Haggerty, who charged Mr. Reuther and his associates with being "frustrated extremists."

Mr. Haggerty's remark was a tart reply to developments last week at the two-day convention of Mr. Reuther's Industrial Union Department (IUD), an alliance of 59 AFL-CIO unions representing 6 million workers. The convention was a combination of angry oratory and a series of resolutions directed at the building trades unions. The resolutions, which will be brought to the Miami convention by the Reuther forces, spell out a series of moves the industrial unions want the full Federation to adopt.

The resolutions, six in all, are certain to be strongly opposed by the craft division. Objections will be raised not only to the IUD-proposed machinery for settling jurisdictional conflicts, but also to the demand that the building trades unions give up their campaign for taking over maintenance work in industrial plants.

While the conflict represents the most serious break within the AFL-CIO since its merger in 1955, it is not expected to result in a final Federation split. Mr. Reuther, even as he castigated the building trades union for "raiding . . . collusion with employers . . . anti-union boycotts" and a variety of other charges, emphasized that organized labor had to stay united in order to remain a power in politics, as a legislative pressure group and an organizing force.

AFL-CIO President George Meany, addressing the convention's 282 delegates, played down the conflict as "inter-union quarrels—trying to take a few members away from another organization or to defend and retain a few members you have . . ." Mr. Meany, whose convention role will probably be persuasive, will seek to modify the positions of both sides.

However, the question left hanging this week was the extent of Mr. Reuther's determination to press for the IUD's resolutions. In their present form, they would inject firm Federation rules against current practices among the craft unions.

Briefly, the IUD resolutions propose the following:

- Binding arbitration for settlement of jurisdictional disputes, including a clause that would make such arbitration decisions enforceable in the courts.
- A convention order directing the building trades to give up their joint efforts with contractors to secure plant maintenance contracts and to stay out of industrial plants organized by production unions.
- Convention support of situs picketing legislation for relief of both craft and industrial unions, thus ending the building trades efforts to press Congress for a bill that would be directed only to craft unions.
- A convention order to the sheet metal workers to cease "raiding" a steelworker-organized plant of Carrier Corp. in Syracuse, N. Y.—with expulsion of the craft union as the penalty for disobeying the order.
- AFL-CIO backing for a proposed Davis-Bacon prevailing wage order—by a committee appointed by Labor Secretary Arthur Goldberg—that could restrict building trades work on missile sites to construction work.
- Establishment of an AFL-CIO fair union practices board to investigate racial discrimination in Federation unions, to recommend remedial action and to make its findings available to the President's Committee on Equal Employment Opportunity.

Virtually all these issues have been raised in IUD-building trades negotiations in the past—and rejected by the craft union leaders. Only the decision to arbitrate jurisdictional disputes was accepted by the building trades—at the 1959 AFL-CIO convention—but there was no decision at that time on how the arbitration system would actually work.

Mr. Reuther told the convention that IUD's move was made at this time because of "frustrations . . . and failures" to settle the recurring conflicts over jobs. The touchiest issue, to the industrial unions, is the plant contract maintenance project of the building trades, where contractors and construction workers are called in to maintain plant equipment handled in the past by plant industrial unions.

"We think it is an instrument of collusion with the employers," Mr. Reuther charged, "in which they try to steal work that historically has been done by maintenance workers covered by industrial union collective bargaining agreements." Mr. Reuther told the industrial unionists this was happening "at a time when we have to run like hell to stand still in our fight for jobs." Between 1953 and 1960, he said, industrial production had increased 17% while manufacturing employment dropped 1.6 million.

The Davis-Bacon committee report is an item of contention between the two groups, the IUD supporting the proposal because it limits Davis-Bacon rates to pure construction work. The craft unions oppose the plan on the grounds that it would restrict their missile jobs, an issue that has been at the center of missile-base work stoppages.

In an answering statement by Mr. Haggerty, read to the convention by Mr. Reuther without comment, the building trades' chief countered that "our unions have been the victims rather than the instigators of raiding. It must be remembered that Mr. Reuther's role in this controversy is that of a special pleader. It is designed to benefit one group of unions."

Mr. Reuther declined to speculate on the prospects for the IUD resolutions at the Miami meeting, or what steps he would take if they failed to pass. Opinions of the IUD delegates were divided on whether Mr. Reuther would win his battle although they doubted that he would lead the industrial unions out of the Federation in a losing battle.

Labor in Brief . . .

• **Licensing**—In an apparent effort to prevent further loss of homebuilding jobs to low-paid and inexperienced workers, the Ontario Council of Carpenters seeks legislation requiring the licensing of carpenters similar to that now applicable to plumbers and electricians. The Council says it would protect owners against shoddy construction and prevent exploitation of cheap labor.

• **Right-to-work**—The Oklahomans for the Right-to-Work are now gathering signatures on an initiative petition to force a general election on a proposed right-to-work law for the state. If the required number of signatures—about 136,000—is obtained, the proposal will go on the November, 1962 ballot.

• **Burt boycott**—The U. S. Supreme Court wrote a final chapter in the long sheetmetal workers' boycott of ventilating equipment made by Burt Manufacturing Co. when it refused to review an Appeals Court decision holding the international union responsible for the boycott. Union's complaint was that the steelworkers union, which organized Burt, had invaded its jurisdiction.

• **Unions lose ground**—Pointing up what Walter Reuther calls AFL-CIO stagnation, the California State Division of Labor Statistics and Research reports that the level of union organization in the state has dropped from 43% of the non-agriculture labor force in 1950 to 36% in 1960. This reflects a nationwide trend.

Ironworkers End Long Dispute

A local of the ironworkers union in Cleveland dropped its demand for pay for time not worked and ended a 37-day strike last week after the personal intervention of Labor Secretary Arthur J. Goldberg.

The union, seeking a guaranteed 40-hour week for union stewards, had demanded that all stewards be paid for a full day even when the rest of the ironworkers on a job are sent home because of inclement weather.

"This is an important victory for a basic principle," a member of the Building Trades Employers' Association said. "We regret that it has been very costly for everyone in the community. But it has been established clearly that the construction industry will not tolerate any further spread of featherbedding."

The strike had stalled over $50 million worth of construction and idled some 2,000 building tradesmen in 10 northeastern Ohio counties.

The shutdown started October 9 with a strike against four concerns. It immediately produced a lockout. The contractor groups (BTEA, Cleveland Chapter of Associated General Contractors and the Steel and Iron Contractors' Association) took the position that "a strike against one is a strike against all."

The union, in pushing its demand for a full day's pay for stewards, claimed that stewards should remain on the job when the ironworkers are sent home in order to make sure that the ironworkers' work is not performed by members of other crafts if the weather clears.

Noting that stewards are already getting "high" pay of $4.26 an hour, the contractors said: "The union stewards don't do anything extra for the contractors. Over and above their work as ironworkers, they serve as the union's representative on the job. If the union leaders think they should be paid for their union duties, let the union pay them."

Federal mediators and Cleveland Mayor Anthony J. Celebrezze tried unsuccessfully to mediate the dispute. Mr. Goldberg entered the dispute after coming to Cleveland for a White House Conference meeting. "I didn't think I would be precipitated into a labor dispute when I came here," he said. Some observers suspect the intervention was pre-arranged.

Under the settlement that was reached, contractors, in return for the union's dropping the steward-pay demand, agreed:

• To pay $5.00 a day show-up pay for all ironworkers who report to work and are sent home because of bad weather —unless the ironworkers are told the day before not to report because of Weather Bureau predictions of rain.

• To drop their demand that all ironworkers be paid by check instead of by cash. As the matter now stands, past practices will continue, with some contractors paying ironworkers by cash and some by check, with some giving time off to cash the checks.

OFFICIAL PROPOSALS

Bids: December 18, 1961

Invitation for Bids
City of Trenton, Michigan
Sewage Treatment and Refuse System
Contract No. 1

Sealed proposals will be received by the City Clerk of the City of Trenton, Michigan, at his office in the City Hall up to 8:00 o'clock P.M., E.S.T. on December 18, 1961, and then publicly opened at the regular Council meeting on December 18, 1961 at 8:00 o'clock P.M., E.S.T., for the furnishing and erection of certain pieces of equipment as follows:

Division A—Combined Refuse and Sludge Incineration Equipment
Division B—Sludge Drying Equipment

The preliminary drawings and specifications under which the equipment is to be furnished and installed are on file and may be examined at the offices of the City Engineer for the City of Trenton, Michigan, or at the offices of McNamee, Porter and Seeley, 2223 Packard Road, Ann Arbor, Michigan, and copies thereof may be obtained from the latter by making a deposit of Twenty Dollars ($20.00) per set. The full amount of deposit will be returned to bidders for each set of documents upon which a bona fide proposal is submitted. For others, Fifteen Dollars ($15.00) will be refunded for each set returned in good condition and within ten (10) days after the bidding date.

A certified check or bidder's bond for a sum not less than five percent (5%) of the amount of the proposal will be required with each proposal.

The right is reserved by the Owner to accept any proposal, to reject any proposal and to waive irregularities in proposals.

No bid may be withdrawn after the above date and time for receiving bids for a period of forty-five (45) days.

City of Trenton, Michigan
Francis S. Thomas,
City Clerk

Bids: December 19, 1961

Ocean Highway Bridges
Deck Reconstruction—Bascule Spans

CAPE MAY COUNTY BRIDGE COMMISSION
CAPE MAY COURT HOUSE, NEW JERSEY
Dated: November 21, 1961

Sealed bids for the reconstruction of the bascule decks of the Ocean Highway Bridges will be received by the Cape May County Bridge Commission in its offices at Cape May Court House, New Jersey, until 2 P.M. Eastern Standard Time, December 19, 1961 and then at said place, publicly opened and read aloud.

The work consists generally of replacing the existing timber deck on the bascule span of the Townsends Inlet, Great Channel, Grassy Sound and Middle Thorofare Bridges, with a new open-grating steel deck and new additional supporting steel stringers, and placing end-welded studs on the existing open grating steel deck on the bascule span of the Corson Inlet Bridge, as shown on the Plans.

The Information for Bidders, Proposal, Contract, Contract Bond, Plans and Specifications may be examined at the office of the Commission, First National Bank Building, Cape May Court House, New Jersey, and at the office of Howard, Needles, Tammen & Bergendoff, Consulting Engineers, 99 Church Street, New York 7, New York.

Contract documents will be furnished for $5.00 for each set, upon application to the Commission or to the Consulting Engineers. The payment will not be refunded and contract documents are not required to be returned.

The Contract will be awarded or the proposals rejected within thirty (30) days from the date of opening proposals. The Commission reserves the right to waive any informalities in and to reject any or all bids.

Cape May County Bridge Commission
Bernard W. Maxwell, Chairman

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.70 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

Bids: December 19, 1961*

New York City Housing Authority Advertisement for Bids De Witt Clinton Houses

Sealed proposals will be received by the New York City Housing Authority, 299 Broadway, New York 7, N. Y., until 2:30 P.M., December 19, 1961*, at which time said proposals will be opened and read in Room 312, for:

1. Foundations & general construction
2. Heating & ventilating
3. Electric work
4. Plumbing
5. Elevators

For DeWitt Clinton Houses (Project NY 5-45): Located in both of the following areas: the area bounded generally by East 110th Street, Lexington Avenue, East 108th Street, and Park Avenue, and the area bounded generally by East 106th Street, Lexington Avenue, East 104th Street, and Park Avenue, excluding certain portions in the latter area as more fully shown and described on the drawings, all in the Borough of Manhattan, New York City. Consisting of five 18-story buildings and one 9-story building, containing 749 apartments and a two-story community center; of reinforced-concrete construction.

No prequalification is required for these contracts.

The Authority will welcome inquiries from contractors, which should be directed to the Construction Department, New York City Housing Authority, 299 Broadway, New York 7, N. Y. (Digby 9-4310, extension 521).

NEW YORK CITY HOUSING AUTHORITY
William Reid, Chairman

* The Authority reserves the right to postpone the bid date.

Bids: January 17, 1962

Corporacion De Obras Sanitarias De Asuncion Paraguay

November 20, 1961

NOTICE TO BIDDERS

Sealed Bids are invited for furnishing and installing the mechanical and electrical equipment for a new diesel engine-driven generator and miscellaneous equipment in the Water Works System for the City of Asuncion, Paraguay, South America. The work includes furnishing, delivering to Asuncion, and installing:

a. A 500 KW Diesel engine-driven generator.
b. Additional switchgear cubicles.
c. Power factor correction equipment.
d. Three, 300 HP or larger, stepless primary resistor motor starters.
e. Furnishing and delivering, without installation, 23 and 6 KV outdoor line equipment.

Bids should be addressed to the Corporacion de Obras Sanitarias de Asuncion, and mailed or delivered to the office at Avenida España 575, Asunción, Paraguay, S. A. so as to be received not later than January 17, 1962, at 9:00 A.M. Bids will be opened publicly at that Office at the time stated, and all Bidders are invited to be present. Award of a contract will be made to the qualified Bidder submitting the most advantageous Bid.

The Contract Documents give specifications for the materials to be furnished.

Plans, Specifications and Contract Documents may be obtained from Rader and Associates, 100 Biscayne Boulevard, South, Miami 32, Florida, U.S.A., upon payment of $35.00. Additional copies of plans, when required, may be had upon payment of one dollar a sheet.

Each Bid must be accompanied by a Bid Guaranty in the amount of five per cent (5%) of the contract price. The successful Bidder will be required to furnish a Performance and Payment Bond in an amount not less than ten per cent (10%) of the Total Contract Price. The Surety Company furnishing the bid guarantee and the Performance and Payment Bond must be authorized to do business in the U.S.A., and the Surety Company and the form of the Guarantee and Performance and Payment Bond must be satisfactory to the Corporacion de Obras de Asuncion, Paraguay.

An equipment performance guarantee bond will be required.

Corporacion de Obras Sanitarias de Asuncion reserves the right to reject any or all bids.

CORPORACION DE OBRAS SANITARIAS DE ASUNCION

Bids: December 12, 1961

The Chicago Housing Authority

THE CHICAGO HOUSING AUTHORITY invites properly qualified bidders to submit proposals for all labor and material required to complete the General Construction of CHA Project Illinois 2-41. The work includes three 16-story elevator type apartment buildings and one 14-story elevator type apartment building containing 593 dwelling units, underground utilities and related site improvements, all located at 41st Street and Lake Park Avenue, Chicago, Illinois.

Bids will be received until 2:00 P.M. (local time) on December 12, 1961, by mail or by hand in CHA Board Room, 3rd floor, 55 West Cermak Road, Chicago 16, Illinois, immediately after which time and at such place all bids will be publicly opened and read aloud.

Bid documents including plans and specifications may be obtained on or after November 14, 1961 by depositing $75.00 in the form of cashier's check, certified check or telegraphic or postal money order with Shaw, Metz and Associates, Architects and Engineers, 208 South LaSalle Street, Chicago 4, Illinois.

Bids: See Advertisement

The Port of New York Authority

Sealed proposals for the following work will be received at the Office of the Chief Engineer, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on date indicated, at which time said proposals will be opened and read in Room 1108.

Contract EP-110.015 — Elizabeth-Port Authority Piers—Terminal Street Extension—Phase II—Paving and Utilities—Deposit $30.00 per set of documents—Bids will be received until 2:30 P.M. on Thursday, December 21, 1961.

Contract BP-110.006 — Brooklyn-Port Authority Piers—Signs on Building No. 50—No Deposit Required—Bids will be received until 2:30 P.M. on Thursday, December 7, 1961.

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design, Room 1115, 111 Eighth Avenue, New York 11, N. Y. Documents will be furnished upon receipt of the above deposit (each set including one copy of the Contract Drawings) for not more than three sets to any one company. Additional sets will be furnished upon payment of an amount for each set equal to the deposit indicated above, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman

New York, November 23, 1961

Bids: January 10, 1962

Triborough Bridge and Tunnel Authority

SEALED BIDS WILL BE RECEIVED BY Triborough Bridge and Tunnel Authority at its office, Administration Building, Randall's Island, Manhattan, New York 35, N. Y., as follows:

Until 11 A.M. Wednesday, January 10, 1962.

For Narrows Bridge Contract No. NB-12, Brooklyn Approach, Brooklyn, New York City.

Each bid must be accompanied by a deposit in the amount of $250,000.00.

The contract includes grading, drainage, concrete piers, retaining walls and abutments, seawall, steel viaducts and bridges and paving.

Plans, specifications and contract documents may be purchased at the office of the Authority for $130.00, which will not be refunded.

U. S. Government

Sealed bids for construction of a new Federal Office Building, at Liberty Avenue and Grant Street, Pittsburgh, Pa., Project No. 36901, will be received until 2:00 P.M., E.S.T., December 19, 1961, and then publicly opened. Bidding material may be obtained from the Design & Construction Division of the Public Buildings Service, 12th floor west, General Services Administration, 250 Hudson Street, New York 13, New York.

CONTRACTORS
WATCH
THIS SECTION

for New Projects

Publish your announcements thru the "Proposal Section" of Engineering News-Record and get their bids.

OFFICIAL PROPOSALS

Bids: December 5, 1961

Directorate of Highways
Ministry of Communications and Public Works
Republic of Honduras

ADVERTISEMENT FOR BIDS
FOR
HIGHWAY AND BRIDGES
Route No. 18—Western Highway
Extension
El Rincon to La Labor—Section 2
(Contract No. 61-3-P)

Sealed proposals for the above noted contract will be received by the Director General of Highways at the Office of the Ministry of Communications and Public Works, Tegucigalpa, D. C., Honduras, C. A., until 10:00 A. M., Honduras time, on December 5, 1961, and then publicly opened.

Prospective bidders can obtain copies of the plans, specifications and contract documents from the Office of the Director General of Highways, Tegucigalpa, D. C., Honduras, for a fee of Lps. 200.00. A Contractor's Financial Statement and Experience Questionnaire and a Plan and Equipment Questionnaire on forms supplied by the Directorate of Highways will be required of all bidders. All proposals must be on the forms prescribed by the Directorate of Highways and must comply with the terms and conditions set forth in the Contract Documents.

Each proposal must be accompanied by a Proposal Guaranty in the amount of ten (10) percent of the total amount shown in the Proposal Form Unit Price Schedule in the form and manner specified in the Instruction to Bidders.

Individuals or firms doing business under fictitious names and all foreign corporations shall register with the Ministry of Communications and Public Works, Tegucigalpa, D. C., Honduras, C. A., before any proposals submitted by such corporation, individuals or firms will be considered.

Award of the contract, if any award be made, will be to the lowest responsible bidder or bidders. The Government reserves the right to reject any and all proposals and further reserves the right to waive any informality in proposals received when such rejection or waiver is in the best interest of the Government.

The Government of Honduras has entered into a Loan Agreement with the International Development Association for a Loan in various currencies to finance the foreign exchange costs of a Highway Construction Project of which this contract will form a part.

JORGE BOGRAN FIALLOS
Director General of Highways
November 1, 1961

Bids: November 28, 1961

Richmond Tunnel
Contract 500

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York 5, New York, until 11:00 A.M., Eastern Standard Time on Tuesday, November 28, 1961, for Contract 500, for the construction of the Richmond tunnel, together with its shafts and appurtenant work. The tunnel, approximately 25,000 feet long, will cross Upper New York Bay and will extend from a shaft in Brooklyn, New York, approximately 925 feet deep, to a shaft in Richmond, New York, approximately 965 feet deep.

Pamphlets of the contract can be obtained in the Secretary's office, Room 1312, at the above address, upon application in person or by mail, by depositing the sum of $10.00 for each pamphlet. There will be a charge of $1.25 to cover mailing costs for each set of contract pamphlets requested. Blueprints of the contract drawings will be furnished at a charge of $3.10. For further particulars, apply at the office of the Chief Engineer at the above address.

ARTHUR C. FORD, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners: Board of Water Supply: MARTIN T. GERAGHTY, Chief Clerk.

Read the Official Proposal Columns of
ENGINEERING NEWS-RECORD
This Week and Every Week

OFFICIAL PROPOSALS

Bids: March 1, 1962

Republica De Nicaragua
Empresa Nacional de Luz y Fuerza
Managua

TMV HYDROELECTRIC SYSTEM, FIRST STAGE — CENTROAMERICA PROJECT, RIO CACAO POWER PLANT — CIVIL WORKS

Invitation for Bids

The Empresa Nacional de Luz y Fuerza (ENALUF), an autonomous entity of the State, Republic of Nicaragua, notifies that, having obtained financing from the International Bank for Reconstruction and Development and from the Development Loan Fund for the construction of the first stage of the TMV Hydroelectric System, will receive sealed bids addressed to the Gerencia de Construccion of the same entity for the construction works hereon specified, until 2.00 p. m. of March 1, 1962, at which time bids will be publicly opened and read aloud.

Contract No.
TMV I a 7-8

Work

Civil works for the Rio Cacao Power Plant.

Location: 5 kilometres NW of Jinotega, Jinotega Department, Nicaragua.

The principal items of the work are:

a. Power canal: 3, 8 km long, 550 000 m³ of earth excavation;

b. Intake: 14 500 m³ excavation, 2 000 m³ concrete, 40 tons reinforcing steel:

c. Power tunnel and Surge tank: 3 km, 3.00 I.D. tunnel: 40 000 m³ rock excavation, 11 000 concrete, 400 tons reinforcing steel;

d. Valve House and Penstock (civil works): 15 000 m³ excavation, 5 000 m³ concrete, 150 tons reinforcing steel;

e. Powerhouse and Substation (civil works): pit-type powerhouse for two, 25,000 kW units; 2 000 m³ excavation, 7 000 m³ concrete, 500 tons reinforcing steel;

f. Tailrace Tunnel and Stilling Basin: 350 m, 4.90 m I.D. tunnel; 213 000 m³ excavation, 3 500 m³ concrete, 100 tons reinforcing steel;

g. Miscellaneous Works: including a 110 m² storehouse, 500 m of access road, powerhouse water and sewer system and minor items.

Copies of Contract Documents, including Specifications and Drawings, may be obtained after December 1st, 1961 from:

1. Empresa Nacional de Luz y Fuerza, Gerencia de Construccion, Managua, Nicaragua, upon payment of 700 Cordobas for the first set, and 210 Cordobas for each additional set;

2. Electroconsult Consulting Engineers, Via Cavallotti 13, Milan, Italy, upon payment of 100 US Dollars for the first set, and 30 US Dollars for each additional set;

The above mentioned payments are not refundable.

Contract Documents including specifications and Drawings may be examined at the two abovementioned places, and at:

3. Nicaragua Embassy in Washington D. C., USA, 1677 New Hampshire Ave., N. W.;

4. General Consulate of Nicaragua in New York, N. Y., USA, 1720 Ave. of the Americas, Rockefeller Center, Suite 2200.

Each bid shall be accompanied by a bid bond for 840 000 Cordobas.

Date of invitation: December 1st, 1961.

EMPLOYMENT NATIONAL COVERAGE OPPORTUNITIES

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Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 645 N. Michigan Ave.
SAN FRANCISCO 11: 255 California St.

• *POSITIONS VACANT*

Electric Systems Engineer—Midwestern consulting engineerin. firm has challenging opportunity in electric systems planning. Work includes network analyzer, sectionalizing and economic feasibility studies. Permanent employment offered to man with 3 to 5 years experience. Submit resume and salary requirements to Stanley Engineering Company, Muscatine, Iowa.

Field Engineer — Permanent position with established Midwest consulting firm for man thoroughly qualified and experienced in all branches of building construction. Moving expenses paid. Electrical or process engineer preferred. Send complete resume to P-7633, Engineering News-Record.

Process Piping Engineer for full or part time work. Telephone—CO 2-5005 Paramus, New Jersey.

C.P.A.—Years of experience in construction and taxes. Must be top man for top, steady position. P-7712, Engineering News-Record.

Civils—Water Resources Planning, domestic and foreign opportunities with expanding consulting firm for irrigation and hydroelectric engineers and hydrologist, minimum 5 years experience. Send resume and salary desired. P-7732, Engineering News-Record.

• *POSITIONS VACANT*

Structural Engineer—Architectural, Civil, or Mechanical Engineer interested in conducting research on uses of light-gage steel in commercial and residential structures and associated building applications. Work involves development of program, design, analysis, production techniques and performance testing. Large Research Laboratory, Pittsburgh, Pennsylvania. Background in research or product development desirable. M.S. or B.S. degree required. Submit resume and salary requirements to P-7768, Engineering News-Record.

Graduate Civil Engineer to learn Prestressed Concrete Fabrication. Recent graduate will be considered. Moving expenses paid to relocate in central Wisconsin. Opportunity involves layout, design of shop drawings, some jobsite work, estimating and quantity take off and field sketches. Good possibility to grow with company. Reply to P-7723, Engineering News-Record, with resume of education and experience.

Draftsman—experienced reinforcing bar detailer and checker. Permanent position with established steel producer. Submit resume of experience, references, and salary expected. All replies confidential. P-7811, Engineering News-Record.

Senior Engineer for general municipal work. Starting salary $6750 with 5 yearly increments to $8250. Must have degree in Civil Engineering. Send summary of experience to City Manager, City Hall, Watertown, New York.

Wanted—Civil Engineer—Experienced in subdivision calculations, design of streets, water and sewer systems, storm drains, etc. Send resume and salary requirements to Ralph L. Kraemer, Western Engineers, Inc., Las Vegas, Nevada.

(Continued on following page)

mei
MEISSNER ENGINEERS, INC.

20 ENGINEERS NEEDED

Expansion has created positions in U.S. and overseas offices.

HIGHWAY—Planning, specifications and cost estimates of major projects; reports and feasibility studies of primary and secondary roads. Five years highway design experience required. Six positions available.

PLANNING AND CONSTRUCTION—Planning engineers for community development and large housing project reports and studies. Experienced construction engineers for supervision of all types of civil projects.

PORT DESIGN—Prepare feasibility studies and reports on harbor improvements, assist in final design planning, specifications and cost estimates. Want graduate engineers with minimum five years experience.

SANITARY—Graduate civil engineers capable of layout of complete systems, and assisting in preparation of final plant design.

Liberal benefits and profit sharing. Reply to Mr. FRED HOEGLER, Personnel Manager

MEISSNER ENGINEERS, INC.
300 West Washington St.
Chicago 6, Illinois

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Retirement, vacation and sick leave benefits. Reply with resume for possible interview to: N. W. Goodman, P.E., West Virginia State Road Commission, Charleston, West. Va.

WEST VIRGINIA
State Road Commission
Charleston, West Virginia

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P-7833, Engineering News-Record
645 N. Michigan Ave., Chicago 11, Ill.

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This is an exceptional opportunity—with definite management potential—to join a nationally known engineer contractor corporation located in New York.

The man we seek should have a record of accomplishment as general superintendent on lump sum projects. Additional experience must include estimating, proposal preparation and sub-contract negotiations.

Reply in full confidence to:
P-7868, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

PROJECT SUPERINTENDENT

STEAM ELECTRIC STATION—OVERSEAS

To supervise construction and start-up of 50,000 kw station in Far East. Heavy power plant construction experience required at same level of responsibility. CE or ME university degree preferred. Local living allowance and family accommodation. Tour starts immediately. This is a responsible position with a reputable consulting engineering firm. Send complete resume and reference to:

P-7870, Engineering News-Record
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40-29 27 Street LIC 1, NY ST 6-9505

DRAFTSMEN and DESIGNERS
For Bridge and Highway Projects
Send resume, references and salary requirements. Draftsmen include samples of recent work.

BROOKHART & TYO
3501 N. Front St. Harrisburg, Pa.

• POSITIONS VACANT
(Continued from preceding page)

Wanted—Experienced, competent engineers to design water works, sewers, water and sewage treatment plants. State age, education, experience, salary expected, when will report. Correspondence confidential. P-7816, Engineering News-Record.

Civil Engineer, graduate or registered. Experienced in field control of highway construction and materials. Complete chronological resume requested. Salary appropriate to age and experience. P-7661, Engineering News-Record.

Engineers and Designers—one or two years of experience in water supply, water distribution, sewerage or sewage treatment plant design. Salary commensurate with ability. Address reply with resume to: O'Brien & Gere, Consulting Engineers, 400 East Genesee Street, Syracuse 2, New York.

Soils Engineer—Masters degree and four years experience. Assist in running consulting engineering office, start after January 1st. $9000 per year. ETCO Engineers and Associates, 10601 Airline Highway, Baton Rouge, Louisiana.

Civil Engineer—Registered Engineer for Public Works Department; begin to $6948 per annum depending on experience; submit detailed resume to Personnel, City Hall, Corpus Christi, Texas.

Project Manager, C.E., Minnesota. Construction of large office building. Public Works, must be experienced; send resume, age, education, experience references. Salary open. P-7826, Engineering News-Record.

Chief Highway Engineer to assume complete direction of consulting office and long term highway engineering project in Saudi Arabia. Will be responsible for client relations and direction of surveys, design and construction supervision. H. W. Lochner, Inc., 20 N. Wacker Drive, Chicago 6, Illinois.

Asphalt Plant Superintendent—Central Eastern Seaboard. Experienced man capable of handling complete plant operation, including ordering materials, plant production and deliveries. State experience & salary desired. P-7844, Engineering News-Record.

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• POSITIONS WANTED

Layout Eng. or party chief-clerk of works, diversified expr., will travel, location immaterial—single. PO Box 949, Hollywood, Fla.

B.S.C.E., P.E., 33. 6 yrs. exp. sewers, hwys, insp. West, Southwest area. PW-7752, Engineering News-Record.

Construction Manager: Excellent and extensive background. Fully qualified all phases building construction. Estimating, purchasing, contract negotiation, field staffing and supervision. Good organizational and administrative ability. Age 45. Full resume and references available. PW-7766, Engineering News-Record.

(Continued on opposite page)

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Classified Advertising Division
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• POSITIONS WANTED

(Continued from opposite page)

Construction Engineer B.S.C.E. 22 yrs. supervision, engineering, design, specifications-highways, airports, marine structures, p.o.l. installations, power plants, water and sewage works, including mechanical and electrical. Fluent French, Spanish and Italian. Age 56. Now in Far East. Available Feb. 1. Write P.O. Box 413, Huntington, New York.

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Field Inspector—Liaison—15 yrs exper. on inspection and testing of equip. and material for chem-power-missile projects both abroad and U.S. PW-7809, Engineering News-Record.

Construction Manager & Superintendent thoroughly experienced all types of and including heavy construction. Excellent & extensive background. Will send references for personal interview consideration. Overseas job acceptable. PW-7846, Engineering News-Record.

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Equip. Supt.: heavy, const. equip. exp. in rebuilding, cost and parts records, fleet dispatch, preventative maint. program. PW-7830, Engineering News-Record.

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Construction Manager, M.C.E., N.Y. P.E., age 38, last 10 years with same NYC contractor. From Field Supervision to top office man. Will fill responsible position. PW-7853, Engineering News-Record.

Constr. Exec., age 35. Legal education. Presently Vice-Pres. major company, top notch administrator, organizer. Practical builder with construction savvy. 12 yrs. exp. industrial, hvy., commercial, res. Want genuine opportunity with growing well managed company or one seeking solid reorganization. PW-7824, Engineering News-Record.

Senior Construction Estimator, 20 successful years experience in quantity survey, pricing, and bidding—all phases of industrial, commercial, and institutional construction, Architectural and Engineering background, now employed. PW-7879, Engineering News-Record.

Project Manager, 13 years experience construction, foundations and buildings. All phases including fieldwork, bid preparation, buying, negotiating. Graduate Engineer. Interested relocating to South, Southwest or West. PW-7861, Engineering News-Record.

Senior Highway Project Engr. C.E., P.E., 36. 10 yrs. exper. on all phases of rural & urban, highway & expressway design & reports. 7 yrs. in responsible charge of highway engineering with consultant, in liaison, super. & admin. Resume on request. PW-7848, Engineering News-Record.

Exec. Assistant—Gal Fri—Genl Contractg Industry—excell. broad exper. all phases construct. office operation incl. office managmt, follow-up, biddg. proceed., expeditg. skills, corresp., submissions, know. subcontracts, plans, spec., sub payments, pub. relat., job requis., purch.-accustomed dealing w/subs & suppliers. PW-7876, Engineering News-Record.

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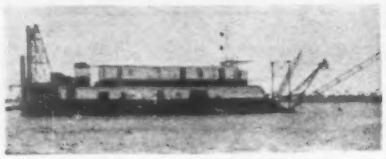

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Counsel on Shelters

ENGINEERS, BEING NORMAL HUMAN BEINGS, are like everyone else beset with doubts, fears, anger and plain revulsion when faced with the decision as to whether it is wise or not to build bomb shelters. No matter what their personal choice, however, if they are going to discharge their professional responsibility, engineers must begin to look at shelters in cold terms of technology and economics, shorn of all the emotionalism that the shelter idea generates.

The fact is that some sort of a shelter program is in the offing. The nation-wide survey of potential shelter locations now getting under way with a congressional appropriation is one sign. Another appeared two weeks ago when a special session of the New York legislature made $100 million available for 50-50 matching by school administrators who want to build shelters.

The time, therefore, will soon be here when engineers will be expected to contribute some sound counsel on design and construction. They should be readying themselves to give it, and in the same impersonal, analytical manner that they would for a bridge, a building or any other kind of a structure.

In one respect, the situation is not unlike that faced in designing against a tornado. It is not worthwhile to attempt to resist the full effect of the swirling wind. In the first place it is nigh onto irresistible, and also there is a far better than even chance that the structure will never be in the direct path of a tornado. So the design loads chosen are those that correspond to whatever magnitude of fringe effect the economics of the project will stand.

Shelter design involves the same kind of economic reasoning. The question is how close to the detonation point of a bomb is it worthwhile—weighing factor of safety against cost—to provide a design for a survival structure. It is certainly closer in than the limit of all blast and fire effect. In any event, since the point of detonation is unknown and may be anywhere, it is not economic just to design against fallout from radioactive particles that slowly waft to the earth when a certain degree of resistance to blast, ground shock and fire is economically within our means.

Another problem that can benefit from sound and sober engineering analysis is the home basement shelter proposal. Considering the possibility that blast or fire will bury the shelter in debris from the house overhead, perhaps a trench-type shelter in the yard is the only sensible solution. Basement shelters under more substantial office or factory buildings, which can and should be designed for lateral loads, may respond to a different set of economic factors, but in either case the need is for unemotional engineering study.

There is also the question of mass shelters, and whether and how to design them for multipurpose use, that must be resolved. And there are many other open questions of a strictly engineering-economic nature for which sensible answers must be provided. It's not a pleasant task to plan for survival, but it is a responsibility that engineers must steel themselves to shoulder.

Construction Abroad

THE NEW PHILOSOPHY ON FOREIGN AID—more loans and fewer grants—is a step in the right direction. Now if the new management in AID (the Administration for International Development) keeps its promise to give preferential treatment to those countries that recognize their responsibilities for self-help and who share the U.S. view of the world crisis, the foreign-aid program will begin to reflect the present realities of our responsibility to spend these vast sums of money.

But a further recognition of reality is required—the necessity for the government to help, or at least not hinder, American engineers and contractors in their attempts to compete successfully with foreign firms on work abroad. Involved, of course, are not only jobs financed by AID, but by the World Bank, the Development Loan Fund and, in a certain sense, foreign jobs no matter where the financing comes from.

Foreign governments such as France, Great Britain and West Germany provide their firms with special credits, frequently with guarantees against loss. Our government, in contrast, not only scrupulously avoids such direct help, but has even acted to raise taxes on profits made overseas and in other ways makes it more difficult for U.S. firms to compete with firms from other countries. An exception should be noted with respect to the Export-Import Bank, whose financing of construction, however, is only a minor part of its operations.

One of the real needs seems to be for better credit terms. What Americans are up against is illustrated by a case cited by Gerald A. O'Connor of Raymond International, Inc., in a recent talk before the American Society of Civil Engineers. A foreign government advanced one of its contractors credit on notes. Carrying a government guarantee, the notes were readily sold in the European market and eventually found a purchaser in the U.S. In effect, U.S. money was thus financing a foreign contractor on a job denied a U.S. contractor because his government gave him no credit help.

The case is symptomatic of the obstacles that U.S. engineers and contractors face in getting work overseas. And even more obstacles will appear when the countries in the European Common Market are joined by Great Britain and learn better how to work together.

A more helpful attitude on the part of our government toward our firms going abroad would bring a bigger return on our foreign-aid investment. As it is, the amount of construction we are doing abroad is being progressively whittled down by foreign competition.

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